The Profitability of Banking Sectors in the Asia-Pacific Region and Their Contributions to Economic Growth

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Abstract

The banking sector plays an important role in national economies by directing funds from savers to investors who create additional wealth in the economy. Dietrich and Wanzenried (2011) argue that a country's economic activities cannot run smoothly if its banking sector is not efficient. Athanasoglou, Brissimis, and Delis (2008) argue that a profitable banking sector is necessary to overcome economic shocks.

This study focuses on ten countries in the Asia-Pacific region which are at different stages of economic development. These countries are of particular interest because of their institutional and regulatory characteristics. The banks in these countries are all subject to similar regulations. For example, they are required to maintain minimum capital adequacy ratios according to the Basel Accords. Furthermore, banks in most of the countries are required to maintain certain proportions of their deposits as cash reserves that cannot be lent out. Based on their stage of economic development, each of the ten countries is classified as belonging to one of three categories: small emerging economies, large emerging economies and developed economies.

Our study focuses on two important aspects of the banking sector. First, we investigate the extent to which profitable banks make a positive contribution to economic growth. Second, we investigate the determinants of bank profitability.

The first part of the thesis investigates the relationship between the profitability of banks and economic growth. In order to investigate this relationship, we use data from ten countries in the Asia-Pacific region for the period from 2004 to 2014. In order to address the research questions, we use different econometric techniques such as linear regressions, nonlinear regressions and Granger causality tests. Our results highlight that a profitable banking sector is an important contributor to

economic growth. In contrast to our expectations, we find a negative relationship between the size of the banking sector and economic growth. Further, we find that the influence of bank profitability on economic growth decreases when the size of the banking sector increases. The results of our causality tests suggest that causality runs from bank profitability to economic growth but economic growth also has a delayed feedback on bank profitability.

The second part of this thesis has four empirical chapters that focus on the factors influencing the profitability of banks. First, we investigate the determinants of the profitability of banks in all countries together. Second, we identify the factors influencing the profitability of Islamic and conventional banks in small emerging economies. Third, we investigate the factors affecting the profitability of banks in large emerging markets, and finally, we investigate the determinants of the profitability of banks in developed economies. We use annual data sets of banks for the period from 2004 to 2014 which was gathered from different sources. We use different econometric techniques such as linear regressions and Wald tests to address the research questions. Overall, our results suggest that credit quality, bank size, capital adequacy ratio and cost management are the key factors influencing the profitability of banks in the Asia-Pacific. Cost-efficient banks with superior credit quality are more profitable than their competitors. We find that the impacts of some of the variables vary across regions and countries.

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Thesis-related research outcomes

The thesis-related output is given below.

Paper under Review

Bird, R., Kumar, V., & Reddy, K. (2017). Factors influencing profitability of the banks in India and China. *Asia-Pacific Journal of Accounting & Economics.*

Working papers

Bird, R., Kumar, V., & Reddy, K. (2017). *Do profitable banks really make a positive contribution to the economy?* (Working paper).

Bird, R., Kumar, V., & Reddy, K. (2017). *Factors influencing profitability of the Islamic and Conventional banks in four Asian Countries* (Working Paper).

Conference Papers

Bird, R., Kumar, V., & Reddy, K. (2017). *Factors Influencing Profitability of the Conventional and Islamic Banks in Four Asian Countries.* Paper presented at 24th Annual Conference of the Multinational Finance Society, Romania.

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Bird, R., Kumar, V., & Reddy, K. (2015). *Factors influencing profitability of the commercial banks in Pakistan and Bangladesh?* Paper presented in Finance Symposium, New Zealand.

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List of Abbreviations

ABA	Australian Bankers Association
ASEAN	Association of Southeast Asian Nations
BOJ	Bank of Japan
CAR	Capital Adequacy Ratio
CRR	Cash Reserve Requirement
ES	Efficient-structure
GDP	Gross Domestic Product
GFC	Global Financial Crisis
IBEF	India Brand Equity Foundation
LAR	Loan to Asset Ratio
LDR	Loan to Deposit Ratio
MENA	Middle East and North African
NPL	Non-performing Loan
NPLR	Non-performing Loan Ratio
OECD	Economic Co-operation and Development
OLS	Ordinary Least-Square Regression
PCB	Private Commercial Bank
ROA	Return on Assets
ROD	Return on Deposits
ROE	Return on Equity
SB	Specialised Bank
SOCB	State-owned Commercial Bank

Chapter 1: Introduction

This study focuses on ten countries in the Asia-Pacific region. This chapter provides an introduction to the study, discusses the research questions, highlights the importance of the study, explains the structure of the thesis and provides a summary of the chapter.

1.1 Purpose

The banking sector is a very important component of the financial system. It attracts funds from depositors and channels these funds to investors who create additional wealth in the economy. Many researchers suggest that banks, by funding productive projects, are a prerequisite for economic growth (Ajibike, 2016; Levine & Zervos, 1998; Önder & Özyıldırım, 2013). Similarly, Dietrich and Wanzenried (2011) argue that the economic activities in a country can be hampered if its banks do not perform their functions effectively.

Athanasoglou et al. (2008) suggest that a profitable banking sector is necessary in order to harness the financing needed to support economic growth. Bank profitability is also important for a country's financial stability (Klein & Weill, 2017) and an increase in bank profitability reduces the likelihood of bank failures (Claeys & Schoors, 2007). There have been numerous academic studies on the extent of the contribution of the banking sector to economic growth. However, the findings are mixed. Some researchers suggest that the financial system has a positive impact on economic growth (Levine, 1997; Thorsten, Demirguc, Ross, & Vojislav, 2000; Wachtel, 2001) while Wijnbergen (1983) and Buffie (1984) argue that financial systems have a negative impact on economic growth.

The focus of our study is firstly on investigating the extent to which a profitable banking sector is important in fostering economic development, and secondly on

investigating those factors that contribute to a profitable banking sector across ten countries in the Asia-Pacific region.

1.2 Research Questions

Using data from commercial banks in ten countries in the Asia-Pacific region from 2004–2014, this thesis focuses on two main research questions:

1. Do profitable banks make a positive contribution to the economies of the ten Asia-Pacific countries?
2. What factors influence the profitability of banks?

In addition to the two main research questions, the study also investigates the causal relationship between the profitability of banks and economic growth. The data was collected from the BankScope database, the World Bank (World Development Indicators) database and websites of the central banks of the countries in the study. The study employs a range of econometric techniques to address the research questions.

1.3 Significance of the Study

One of the primary goals of policy makers in any country is to foster economic growth. The first part of this thesis focuses on the relationship between profitable banks and economic growth. It aims to assist policy makers to make important decisions in relation to the structure of the banking sector. The second part of thesis investigates the factors that influence the profitability of banks. These factors include the regulatory variables (capital adequacy ratio requirements and cash reserve requirements) and monetary policy instruments (interest rates). This will help policy makers in making important decisions pertaining to monetary policy and bank regulations.

1.4 Structure of the Thesis

In total, there are ten chapters in the thesis. Five of them are empirical studies that focus on the two main research questions.

Chapter 2 provides an overview of the banking sectors of the ten countries in the Asia-Pacific region that we include in this study. Chapter 2 discusses the financial system in each country, and explains their regulatory and institutional characteristics.

Chapter 3 reviews the previous empirical research on the relationship between financial sector development and economic growth, and on the determinants of the profitability of banks.

Chapter 4 discusses the sources of data, and outlines the steps taken to cleanse the data. In addition, we outline the various empirical methods employed across the five empirical chapters.

Chapter 5 addresses the research question "Do profitable banks make a positive contribution to economic growth across our ten Asia-Pacific countries?" The study is the first to investigate the relationship between bank profitability and economic growth in the Asia-Pacific region and it therefore makes a significant contribution to the finance and economics literature. Our results highlight that a profitable banking sector is a prerequisite for economic growth in the Asia-Pacific region. Perhaps surprisingly, we find that bank size is inversely related to GDP growth with the influence of bank profitability on economic growth decreasing when the size of the banking sector increases. The existence of a positive relationship between bank profitability and economic growth increases the importance of having a better understanding of what factors contribute to a more profitable banking sector.

Chapter 6 investigates the determinants of the profitability of banks across all ten countries. The results suggest that banks that maintain tight control over both credit and costs are the most profitable. Our findings indicate a negative relationship between non-performing loans and banks' profits, suggesting that banks with more conservative lending policies achieve superior performance. The results show that the impacts of some of the variables vary across subsamples. For example, the loan to deposit ratio is positively correlated with the profitability of banks in developed economies and small emerging economies, but it has a negative impact on bank profits in large emerging economies.

Chapter 7 investigates the determinants of the profitability of conventional and Islamic banks in four small emerging markets: Bangladesh, Indonesia, Malaysia and Pakistan. These four countries have dual banking environments where Islamic banks operate in parallel with conventional banks. Our results suggest that conventional banks are more profitable than Islamic banks. We find that the impacts of some variables on bank profits vary across Islamic and conventional banks. The capital adequacy ratio has a positive impact on the profitability of conventional banks but has no impact on the profitability of Islamic banks. Similarly, we find a positive relationship between bank size and the profitability of conventional banks but the effect of bank size on the profitability of Islamic banks is insignificant.

The banking sector is particularly important for countries that are experiencing rapid economic growth. In Chapter 7 we investigate the determinants of the profitability of banks in India and China, which have both enjoyed average annual economic growth of in excess of 7% over the last five years. We find that credit quality, capital adequacy and cost management are the key factors affecting the profitability of banks in India and China. Furthermore, the results suggest that the

impacts of some of the variables vary across India and China; for example, bank size is positively correlated to the profitability of banks in India but negatively correlated to the profitability of banks in China, and privately-owned banks outperform state-owned banks in India but there is no evidence of this being the case in China.

Chapter 8 investigates the determinants of the profitability of banks in the developed economies of Australia, Hong Kong, Japan and Singapore. The results suggest that non-performing loans, increased bank size and overheads have a negative impact of the profitability of banks in these economies. On the other hand, banks with higher capital adequacy ratio and higher loan to deposit ratios are more profitable than their competitors. The results suggest that the impacts of some of the variables vary across subsamples. We find a positive impact of loan to deposit ratios on the profitability of banks in three countries (Australia, Hong Kong and Singapore) but the loan to deposit ratio does not have a significant impact on the profitability of banks in Japan. Similarly, off-balance sheet activities had a positive impact on the profitability of banks in Hong Kong and Singapore but a negative impact on profitability of banks in Australia and Japan.

Chapter 10 provides the summary of key findings, discusses the policy implications and also the possibilities for further research in this area.

1.5 Conclusion

This thesis focuses on two aspects of banking sector: the relationship between the profitability of banks and economic growth, and the determinants of the profitability of banks. In the next chapter, we will discuss the banking sectors of the ten Asia-Pacific countries in our sample.

Chapter 2: Overview of Banking Sectors

This chapter provides an introduction to the financial system and the role of commercial banks. It also explains the institutional and regulatory characteristics of the banking sectors of ten countries in the Asia-Pacific region.

2.1 Introduction to the Financial System

The financial system is composed of financial markets and financial intermediaries. Financial markets include capital markets, commodity markets, money markets, derivative markets, future markets and foreign exchange markets. Financial intermediaries include commercial banks, non-banking institutions, investment companies, mutual funds, insurance companies and house-building finance corporations (World Bank, 2005).

Our research focuses on commercial banks which are an integral part of the financial system and the overall economy. Banks are the most important suppliers of credit. The banks act as financial intermediaries and facilitate the exchange of payments between individuals, corporations and governments (World Bank, 2005). The functions of banks can be divided into two categories – primary and secondary. The primary function of banks is to accept deposits from savers and channel these deposits to corporations, governments and individuals. There are different types of deposits such as current deposits, savings deposits and fixed deposits. Similarly, banks grant loans in many forms such as overdrafts, cash credits and fixed loans. The secondary function of banks is to provide agency services and utility functions. Agency services include the transfer of cheques and the collection of cheques, while utility functions consist of locker facilities and underwriting services. Banks are also responsible for the exchange of domestic and international payments between

various parties; therefore, economic activities cannot run smoothly without an efficient banking system.

This study focuses on ten countries in the Asia-Pacific region. The selected countries are at different stages of economic development but the banks in the countries are subject to similar regulations and policies. For example, the banks in all countries are required to maintain capital adequacy ratios according to Basel Accords. In addition, banks in most of the countries are required to maintain certain portion of deposits as cash reserves. The cash reserves assist banks to maintain liquidity and it also safeguards the interest of depositors. Banks in most of these countries have similar criteria for the classification of their non-performing loans. For example, in all the countries, except Indonesia, loans are classified as non-performing loans when they are overdue by 90 days. These countries are of particular interest because of their institutional and regulatory characteristics. We have placed each of these countries into one of the following three categories based on the state of their economy: small emerging economies, large emerging economies and developed economies. In this section, we will discuss the institutional and regulatory characteristics of the banking sectors of the countries in our study.

2.2 Small Emerging Economies

The small emerging economies included in our study are Bangladesh, Indonesia, Malaysia and Pakistan. In each of these countries, Islamic banks operate in parallel with the conventional banking system.

Bangladesh

The banking industry of Bangladesh comprised only eight banks when it became an independent nation in 1971. The number of banks had risen to 40 conventional

and 24 Islamic banks[1] in 2014. They had total assets of US$105 billion which is equivalent to 61% of the GDP of Bangladesh. The commercial banks in Bangladesh are divided into four categories, that is: state owned commercial banks (SOCBs); specialised banks (SBs); private commercial banks (PCBs); and foreign commercial banks (Bangladesh Bank, 2014). Islamic banking in Bangladesh was started in 1983. In 2014, the assets of Islamic banks were worth US$16.3 billion, held by eight fully-fledged Islamic banks and the Islamic windows or branches of 16 conventional banks (Bangladesh Bank, 2015).

Indonesia

Until 1982 the banking sector in Indonesia comprised a central bank and several state-owned banks. Currently, the banking industry in Indonesia consists of 109 conventional banks and 34 Islamic banks (Bank Indonesia, 2014). Islamic banks include full-fledged Islamic banks and Islamic windows of conventional banks. Indonesian banking sector consists of state-owned and private banks but four state-owned banks control about one-third of the total assets of the banking sector (Global Business Indonesia Guide, 2014). In 2014, total assets of the industry stood at US$472 billion which is equivalent to 53% of the total GDP of Indonesia. Indonesia is the world's largest Islamic country, with over 200 million Muslims. Islamic banking in Indonesia has witnessed an average annual growth rate of over 65% during the last five years which is three times faster than the growth rate enjoyed by conventional banks (Reuters, 2014). Currently, the Islamic banking sector in Indonesia comprises 11 fully-fledged Islamic banks and Islamic windows in 23 conventional banks. The Islamic banking sector has total assets US$22.5 billion.

[1] Islamic banks include full-fledged Islamic banks and Islamic windows of conventional banks

Malaysia

In Malaysia, banking services started with the establishment of a chartered bank in 1875. The Malaysian banking sector now comprises 37 conventional and 16 Islamic banks [2]with total assets of US$709 billion which is equivalent to 210% of the GDP of Malaysia. Islamic banking in Malaysia commenced in the 1970s. With the commencement of Islamic banks, Malaysia became the first country to have a dual banking system. The Islamic banking sector in Malaysia comprises six fully-fledged Islamic banks and Islamic windows in 10 conventional banks. The Islamic banking sector has total assets of US$125 billion. Twenty per cent of the world's Islamic bank assets are held in Malaysia, making it the country with the second-largest Islamic bank assets[3] (World Islamic Banking, 2014).

Pakistan

Over the last four decades, the banking industry in Pakistan has witnessed a dramatic transition, with the dominance of government banks giving way to private banks. All of the country's private banks were nationalised in 1970s. In 1990, government shareholding in the banking sector was 93%. However, due to reforms in the 1990s to stimulate banking activities (Imran & Nishat, 2013), government ownership had declined to 22% in by 2004 (State Bank of Pakistan, 2006). Despite inconsistent policies, the banking industry is one of the fastest growing sectors of the economy. The total assets of Pakistani banks reached the US$117 billion mark in 2014, and the number of commercial banks rose to 28 conventional banks and 20 Islamic banks. Islamic banks include full-fledged Islamic banks and Islamic windows of conventional banks. Total assets are equivalent to 48% of the total GDP

[2] Islamic banks include full-fledged Islamic banks and Islamic windows of conventional banks
[3] Qatar holds 24% of the assets of Islamic banking industry of the world.

of the country. The central bank of Pakistan made several attempts to launch Islamic banking in the country in the 1980s, but these attempts were unsuccessful due to the absence of a Sharia compliance framework. Islamic banking was re-launched successfully in 2001, and since then it has been experiencing an average annual growth rate of 30% (State Bank of Pakistan, 2014). The assets of Islamic banks amounted to US$ 10 billion in 2014, with five full Islamic banks and Islamic windows in 15 commercial banks.

Table 2.1 highlights the regulatory and institutional characteristics of the banking systems in Bangladesh, Indonesia, Malaysia and Pakistan. On the basis of total assets, Malaysia has the largest banking sector, although Indonesia has the largest number of banks. The table highlights that financial inclusion is very low in these countries, ranging from eight branches per 100,000 adults in Bangladesh to 11 branches per 100,000 adults in Malaysia. The bank assets to GDP ratio is the highest (210%) in Malaysia and the lowest in Pakistan (48%).

Table 2.1: Regulatory and institutional characteristics of small emerging economies

Country Name	**Bangladesh**	**Indonesia**	**Malaysia**	**Pakistan**
Total assets (USD)	105 billion	472 billion	709 billion	117 billion
Number of conventional banks	40	109	37	28
Number of Islamic banks*	24	34	16	20
Minimum capital adequacy ratio requirement (%)	10%	8%	8%	10%
Cash reserve requirement (%)	5%	6%	4%	5%
Non-performing loan (NPL) criteria (days)	+ 90	+ 365	+ 90	+ 90
Financial inclusion (branches/100,000 adults)	8	9.6	11	9
Bank assets to GDP ratio	61%	53%	210%	48%
GDP growth rate (%)	6.06%	5.02%	6.01%	4.67%

Notes: *It includes full-fledged Islamic banks and Islamic windows of conventional banks.
Data related to total assets and number of banks, capital adequacy ratio requirement, cash reserve requirement, and non-performing loan criteria were collected from websites of central banks. Data related to financial inclusion, bank assets to GDP ratio and GDP growth rate were collected from the World Bank database.

2.3 Large Emerging Economies

The large emerging economies included in our sample are China and India. The banking sectors in both China and India have undergone a series of reforms to improve their performance, and to raise the standard of their operations so that they are more on a par with international norms.

China

China is the second-largest economy of the world after the United States and the GDP growth rate of China has remained at over 7.5% per annum over the last five years. At the end of 2014, China's banking sector comprised 672 commercial banks [4] with total assets of US$28.3 trillion (China Banking Regulation Commission, 2014) which is equivalent to 270% of China's GDP. Commercial banks in China are broadly divided into large commercial banks, joint-stock commercial banks, city commercial banks, rural commercial banks and foreign banks (Tan, 2016). The Chinese banking system is highly concentrated, with the five largest state-owned banks holding more than 50% of total bank assets (Elliott & Yan, 2013). The banking industry in China is highly regulated, with strict capital adequacy requirements (8.5% of risk-weighted assets) and stringent cash reserves requirements (19% of deposits). Financial inclusion in China is lower than in India, with eight branches per 100,000 adults.

India

India is one of the fastest growing economies in the world, with an average growth rate of 7.2% over the last five years. At the end of 2014, the Indian banking sector comprised 89 banks with total assets of US$1.8 trillion (India Brand Equity

[4] Five large commercial banks, 12 joint-stock commercial banks, 145 city commercial banks, 468 rural commercial banks and 42 foreign banks.

Foundation, 2016) which is equivalent to 88% of the GDP of India. Commercial banks in India are broadly divided into public sector banks, private banks and foreign banks. The banking industry in India is also highly regulated, with stringent capital requirements (9% of risk-weighted assets) and cash reserves requirements (4% of deposits). Financial inclusion is low with 12 branches per 100,000 adults.

Table 2.2 highlights the regulatory and institutional characteristics of the banking systems in China and India. The Chinese banking sector is larger than India's, with total assets of US$1.8 trillion. Financial inclusion in both countries is low, with eight branches per 100,000 adults in China and 12 branches per 100,000 adults in China. The bank assets to GDP ratio is higher in China (270%) than it is in India (88%).

Table 2.2: Regulatory and institutional characteristics of large emerging economies

Country Name	**China**	**India**
Total assets (USD)	28.3 trillion	1.8 trillion
Number of banks	672	89
Minimum capital adequacy ratio requirement (%)	8.50%	9.00%
Cash reserve requirement (%)	19%	4%
Non-performing loan (NPL) criteria	+ 90 days	+ 90 days
Financial inclusion (branches/100,000 adults)	8	12
Bank assets to GDP ratio	270%	88%
GDP growth rate (%)	7.30%	7.24%

Notes: Data related to total assets and number of banks in India were obtained from the Reserve Bank of India. Data related to total assets and number of banks in China were obtained from annual reports of the Chinese Banking Regulation Commission. Information about capital adequacy ratio requirements and cash reserve requirements was collected from the websites of central banks of India and China. Data related to financial inclusion, bank assets to GDP ratio and GDP growth rate were collected from the World Bank database

2.4 Developed Economies

The developed economies in our study include Australia, Hong Kong, Japan and Singapore.

Australia

The banking sector of Australia is well developed. It has 70 banks which include domestic banks, foreign subsidiary banks and foreign branch banks. In 2014, total assets of the Australian banking industry were US$3.26 trillion which is equivalent to 271% of the GDP of Australia. House loans constitute the largest share at US$1.22 trillion. This is 37% of total bank assets. Four major banks dominate the banking industry in Australia, with over 70% of industry assets (Australian Prudential Regulation Authority, 2018). Financial inclusion in Australia (30 branches per 100,000 adults) is better than in any of the other sampled countries except Japan.

Hong Kong

The banking sector in Hong Kong comprises 57 banks which are classified into three types: licensed banks; restricted licensed banks; and deposit-taking banks. All these banks are jointly referred to as authorised institutions. In 2014, total assets of the banking industry of Hong Kong were US$749 billion which is equivalent to 257% of the GDP of Hong Kong. Financial inclusion of the banking sector in Hong Kong (23 branches per 100,000 adults) is better than it is for all other countries in the sample except Japan (34 branches per 100,000 adults) and Australia (30 branches per 100,000 adults).

Japan

The Japanese banking sector comprises 198 banks which include regional banks, city banks, trust banks, second association regional banks, shinkin banks and credit cooperatives. In 2014, total banking assets were US$8.9 trillion which is equivalent

to 185% of the GDP of the country. Japan is one the largest international lenders in the world (Finance Asia, 2014). The deposits of the banking sector were worth US$1.4 trillion in 2014 (Bank of Japan, 2014). Japan is the third-largest economy in the world. The economy of Japan has remained stagnant for the last 20 years as a result of the deflation it has experienced.[5] Financial inclusion in the banking sector in Japan (34 branches per 100,000 adults) is better than in all the other countries in our sample.

Singapore

Singapore is the largest foreign exchange trading centre of Asia (The Straits Times, 2017). In 2014, the banking sector of Singapore comprised 124 banks which included domestic and foreign banks. Foreign banks are further classified into four categories: full banks; wholesale banks; offshore banks; and merchant banks. The total assets of commercial banks in 2014 were US$770 billion which is equivalent to 250% of the total GDP of Singapore. The banking sector reported total net profits of over US$12.7 billion in 2014. Financial inclusion is low with 9.5 branches per 100,000 adults.

Table 2.3 highlights the regulatory and institutional characteristics of the banking system in the four countries. The Japanese banking sector is the largest, with total assets of US$8 trillion. Financial inclusion is higher in Japan (34 branches per 100,000 adults) and Australia (30 branches per 100,000 adults) than in Hong Kong and Singapore. The bank assets to GDP ratio is highest in Hong Kong (267%) and lowest in Japan (185%).

Table 2.3: Regulatory and institutional characteristics of developed economies

[5] The Bank of Japan aims to achieve inflation of 2% in the next two years to promote growth in the country.

Country Name	Australia	Hong Kong	Japan	Singapore
Size (USD)	3.3 trillion	749 billion	8.9 trillion	770 billion
Number of banks	70	56	198	124
Minimum CAR requirement	8%	8%	8%	10%
Reserve Requirement	0%	0%	0.1% - 1.3%*	3%
Non-performing loan (NPL) criteria	+ 90 days	+ 90 days	+ 90 days	+ 90 days
Financial inclusion (branches/100,000 adults)	30	23	34	9.5
Bank assets to GDP ratio	271%	257%	185%	250%
GDP growth rate (%)	2.50%	2.68%	-0.03%	3.26%

Notes: *Reserve requirements vary by type of financial institution and by size of deposits.
Data related to total assets and number of banks, capital adequacy ratio requirement, cash reserve requirement, and non-performing loan criteria were collected from websites of central banks. Data related to financial inclusion, bank assets to GDP ratio and GDP growth rate were collected from the World Bank database

2.5 Conclusion

The chapter highlights the institutional and regulatory characteristics of the ten countries in our study. All ten are in the Asia-Pacific region and are at different stages of economic development. Some of the most noticeable differences are in: the sizes of the banking sectors in different countries; the levels of financial inclusion, which are much lower in developing countries; and bank assets to GDP ratios. All ten countries have similar bank regulations. For example, most central banks require banks to maintain minimum capital adequacy ratios, and most of the banks in all ten countries are required to maintain a certain percentage of their deposits as cash reserves.

Chapter 3: Literature Review

This chapter focuses on the theoretical and empirical literature relating to financial sector development and economic growth. The chapter also discusses the indicators of economic growth and the indicators of the profitability of banks.

3.1 Introduction

Given the crucial role that the financial sector plays in economies, it is not surprising that it has been the subject of much academic interest. There is still much disagreement as to the contribution that the sector makes to the economic development (Boulila & Trabelsi, 2004). Some researchers argue that the financial sector plays a significant role by making a positive contribution to economic growth (Beck, 2001; Beck & Levine, 2004; King & Levine, 1993a, 1993b; Levine, 1997; Levine, Loayza, & Beck, 2000; Rajan & Zingales, 1998; Wachtel, 2001). On the other hand, Wijnbergen (1983) and Buffie (1984) have highlighted instances where the financial system has had a negative effect on the economic growth. Other views include the suggestion that there is no relationship between the size of the financial sector and economic growth (Lucas, 1988; Stern, 1989). Even if one accepts that the size of the financial sector has a positive impact on economic growth, this raises the question of how this occurs (Gupta, 1984; Spears, 1992).

3.2 Conceptual Framework

Many researchers have developed theories on the importance of the financial sector for economic growth. The earliest contribution comes from Schumpeter (1911). According to Schumpeter, financial institutions provide various services including mobilisation of deposits, evaluation of projections and facilitation of transactions. He argues that financial intermediaries promote technological innovation and

economic growth by financing productive projects. The World Bank (1989) and Stulz (2000) argue that the financial sector contributes positively to economic growth by efficiently managing the flow of funds from households to entrepreneurs and corporations. Taking a slightly different tack, McKinnon (1973), Shaw (1973), Fry (1988), Gupta (1987) and Bencivenga and Smith (1991) suggest that the financial sector directly facilitates savings which results in capital formation. Savings are used to fund productive projects which contribute to economic growth. They argue that the rate of return (interest rate) on deposits is a key factor behind capital formation.

An opposing view in the literature suggests that it is the economy which promotes growth and financial sector development (Robinson, 1952; Stern, 1989). During economic expansion, production and manufacturing activities increase, and therefore, additional financial services are required. Financial institutions react to the demands of the economy by transferring resources from sectors with low demand to those with high demand.

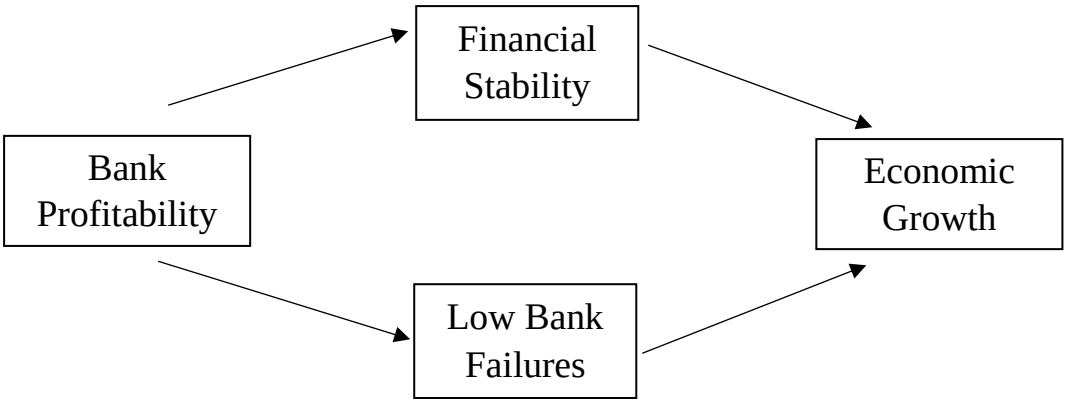
Many studies suggest that the relationship between financial sector development and economic growth is nonlinear and depends on a country's stage of economic development and level of financial sector development. Some of these studies suggest that financial sector development has a positive impact on economic growth in high income countries and a negative or insignificant impact in low income countries (Chen, Wu, & Wen, 2013; Deidda & Fattouh, 2002; Rioja & Valev, 2004) while some studies argue that the relationship between the size of the financial sector and growth is positive when the financial sector is relatively small but it weakens and even turns negative as the financial sector grows (Arcand, Berkes, & Panizza, 2015; Cecchetti & Kharroubi, 2012; Law & Singh, 2014).

The evidence suggests a two-way relationship exists between the financial sector and economic growth. However, the relationship varies depending on the stage an economy is in its economic development.

The first part of thesis focuses on the relationship between profitable banks and economic growth. This is the first study that has explored this relationship in a range of countries. The report by European Central Bank (2016) suggests that profitable banks have potential to generate capital through retained earnings and are able to attract capital from investors. The report further suggests that the profitability of the banks is also important for the sustainability of the banking system and profitable banks are capable to inject funds in the economy. There is also an empirical evidence that suggests that profitable banks are less likely to fail. For example, an empirical study by Claeys and Schoors (2007) suggests that increase in bank profitability reduces the likelihood of bank failures. Hence, bank profitability is considered as one of the key measures to predict bank failures such as Z-Score and CAMELS rating system. Further, Dr. Willem F. Duisenberg, President of the European Central Bank mentioned in his speech in 2001 that financial stability is pre-requisite for economic growth. There are number of studies that suggest a direct link between financial stability and economic growth. Creel, Hubert and Labondance (2015) suggest that financial instability results in a negative economic growth in EU. There are other studies that support this notion. For example, studies by Levine (1997), Thorsten, Demirguc, Ross, & Vojislav (2000) and Wachtel (2001) also suggest that financial sector development promotes economic growth. Similarly, there are number of studies that suggest bank failures lower the economic growth For example, Bernanke (1983), Calomiris and Mason (2003), and Anari, Kolari, and Mason (2005).

Based on theories and empirical findings, Figure 1 shows the conceptual link between bank profitability and economic growth.

Figure 1: Conceptual nexus between Bank Profitability and Economic Growth



3.3 Empirical Literature

3.3.1 Financial Sector Development and Economic Growth

Many studies have empirically investigated the relationship between financial sector development and economic growth. Prior studies have used different proxies to measure financial sector development. The common proxies used in the literature are: bank credit to the private sector, total assets, loans, deposits, money supply and bank claims. To a large extent, prior studies have found that financial sector development has a positive impact on economic growth (Levine, 1997; Beck at el 2000). However, some studies suggest a negative relationship between financial sector development and economic growth (Buffie, 1984; Wijnbergen, 1983).

Goldsmith (1969) completed one of the earliest studies that investigated the impact of the financial sector on economic growth. Goldsmith used data from 35 countries for the period from 1860 to 1963. Using the ratio of financial institution assets to GDP to measure financial sector development, he concludes that financial sector development promotes economic growth. After Goldsmith, extensive work in this

area occurred in the 1990s. Studies by King and Levine (1993a) and King and Levine (1993b) are considered to be benchmark studies. They used data from 80 countries for the period from 1960 to 1989. Using the ratio of current liabilities of the financial sector to GDP, the ratio of non-financial private sector liabilities to total credit and the ratio of non-financial private sector liabilities to GDP as measures of financial sector development, they report that the financial sector promotes economic growth largely as a result of the role played by financial institutions in evaluating promising projects and financing those that are productive and innovative. Levine and Zervos (1998) used the ratio of credit to private sector to GDP as a measure of bank development. They used data from 47 countries for the period from 1976 to 1993. Their results suggest a positive relationship between bank development and long-term economic growth. Using data of 74 countries for the period 1960–1995, Levine et al. (2000) also find a positive impact of financial sector development (as measured by liquid liabilities to GDP ratio, bank assets to total assets of banks and central bank ratio and credit to private sector to GDP ratio) on economic growth. Studies that suggest a negative impact of financial sector development on economic growth include De Gregorio and Guidotti (1995), La Porta, Lopez‐de‐Silanes, and Shleifer (2002) and Prochniak and Wasiak (2017). Using the ratio of domestic credit to the private sector to GDP as a proxy for financial sector development, De Gregorio and Guidotti (1995) find a negative relationship between financial sector development and economic growth in Latin America during the 1970s and 1980s. They argue that the liberalisation of financial markets in 1970s in many Latin American countries was a major reason for the negative impact of financial sector development on economic growth. Similarly, La Porta et al. (2002) also use the ratio of private credit to GDP to measure financial

development, and find a negative relationship between financial sector development and economic growth. A recent study by Prochniak and Wasiak (2017) also find a negative impact of financial sector development (domestic credit as a percentage of GDP) on economic growth in the Organisation for Economic Co-operation and Development (OECD) countries and 28 European Union countries from 1993 to 2013. Their findings suggest that the Global Financial Crisis in Europe was one of the reasons for the negative impact of financial sector development on economic growth.

3.3.2 Financial Sector and Economic Growth: Causality Analysis

Many researchers have reported a causal relationship between financial sector development and economic growth but the direction of the casualty is still not clear. In the literature, there are four types of the hypotheses associated with the causal relationship between financial sector development and economic growth: supply-leading causality; demand-following causality; bidirectional causality; and no causality. Supply-leading hypotheses suggest that the financial sector promotes economic growth (Ahmed & Ansari, 1998); demand-following hypotheses suggest that economic growth promotes financial sector development (Robinson, 1952; Stern, 1989) ; bi-directional causality suggests that there is a two-way relationship between financial sector development and economic growth (Harrison, Sussman, & Zeira, 1999; Patrick, 1966); and no causality hypotheses suggest there is no relationship between financial sector development and economic growth (Lucas, 1988).

Pradhan, Arvin, Hall, and Bahmani (2014) investigated the short-run and long-run relationships between economic growth, banking sector development, stock market development and macroeconomic indicators in 26 ASEAN countries from 1961 to

2012. They use a composite index for banking sector development that consists of broad money supply, claims on private sectors and domestic credit to the private sector. They conclude that causality ran from banking sector development to economic growth in most of the countries in their sample. (Ahmed & Ansari, 1998) investigate the causal relationship between financial sector development and economic growth in three South Asian countries (Pakistan, India and Sri Lanka) from 1973 to 1991 using money (M1) and quasi-money, broad money (M2) and domestic credit as measures of financial sector development. They find a unidirectional causality from financial sector development to economic growth in Sri Lanka but a bidirectional causal relationship in India and Pakistan. Jun (2012) investigates a causal relationship between financial sector development and economic growth in 27 Asian countries from 1960 to 2009 and reports a bidirectional causal relationship between financial sector development (liquid liabilities to GDP ratio and domestic credit to GDP ratio) and economic growth. Kar, Nazlıoğlu, and Ağır (2011) uses six different measures of financial sector development to investigate the causal relationship between financial sector development and economic growth in Middle East and North African (MENA) countries between 1980 and 2007. They find evidence for both supply-leading and demand-following hypotheses. They suggest that causal relationships between financial sector development and economic growth vary across countries and across the indicators of financial sector development. Ndlovu (2013) investigates a causal relationship between financial sector development and economic growth in Zimbabwe from 1980 to 2006. He reports a unidirectional relationship and concludes that financial sector development is an outcome of economic growth rather than a contributor to it. Odhiambo (2010) examines the causal relationship

between financial development and economic growth in South Africa. Using three measures of financial sector development (M2/GDP, private sector credit to GDP ratio and liquid liabilities to GDP ratio), Odhiambo argues that causality runs from economic growth to financial development.

3.3.3 Financial Sector and Economic Growth: Nonlinear Studies

Several recent studies have confirmed the existence of a nonlinear relationship between financial sector and economic growth. Most of these studies suggest that the impact of financial sector development is positive up to a certain point, and that after that point it harms economic growth. Using data from 50 countries for the period from 1980 to 2009, Cecchetti and Kharroubi (2012) suggest an inverse U-shaped relationship between financial sector development (credit to private sector) and economic growth. They conclude that financial development promotes economic growth until the private sector credit to GDP ratio is close to 90%, and that after this point, it has a negative effect on growth. Law and Singh (2014) also find a nonlinear relationship between financial sector development and economic growth in 87 countries in the period from 1980 to 2010 using threshold levels of 94%, 97% and 100% for private sector credit to GDP ratio, liquid liability to GDP ratio and domestic credit to GDP ratio, respectively. They conclude that financial sector development promotes economic growth until threshold levels are reached but after that, financial sector development harms economic growth. Shen and Lee (2006) find a weak inverse U-shaped relationship between banking development (private sector credit to GDP ratio and liquid liabilities to GDP ratio) and economic growth in 48 countries in the period from 1976 to 2001. Deidda and Fattouh (2002) investigate nonlinearity between financial development and economic growth using data from 119 countries in the period from 1960 to 1989. They divide the countries

into high income and low income groups based on income per capita. They report that both private sector credit to GDP ratio and liquid liabilities to GDP ratio are positively related to economic growth in high income countries but the effect was insignificant in low income countries. Using a similar approach, Chen et al. (2013) also report a positive relationship between financial sector development and economic growth in high income Chinese provinces, and a negative relationship in low income Chinese provinces. They use data from 28 Chinese provinces in the period 1978 to 2010. They argue that governments in the low income provinces availed large amount of loans. The loans were utilised in unproductive ways by governments and this resulted in a negative relationship between financial development and economic growth. Rioja and Valev (2004) investigate the relationship between financial sector size (private credit to GDP ratio) and economic development in 74 countries in the period from 1995 to 2001. Based on development of the financial sector, they classify the countries as low, middle and high regions based on financial sector size. Their findings suggest financial sector development had a positive impact on growth in middle and high regions. However, the impact was insignificant in low regions.

3.4 Profitability of Banks

Many research studies have emphasised the contribution of the banking sector to economic development (Levine, 1997; Wachtel, 2001). However, the banking sector needs to be profitable in order to overcome negative economic shocks (Athanasoglou et al., 2008). The economic activities in a country can be hampered if the banks do not perform their functions effectively (Dietrich & Wanzenried, 2011). A number of studies have identified the key factors which influence the profitability of banks.

Short (1979), Bourke (1989) and Molyneux and Thornton (1992) were the first researchers to investigate the determinants of profitability for banks. Their work has been extended by other researchers including Demirgüç-Kunt and Huizinga (1999), Abreu and Mendes (2001)), Staikouras and Wood (2011), Micco, Panizza, and Yañez (2007), Pasiouras and Kosmidou (2007), Dietrich and Wanzenried (2011) and Mirzaei, Moore, and Liu (2013).

The literature provides evidence of the impact of various factors on the profitability of banks. Overall, empirical results tend to vary across countries and/or data sets. This section discusses empirical single-country studies, cross-country studies and studies of Islamic banks.

3.4.1 Single-Country Studies

Wong, Fong, Wong, and Choi (2007) investigate the determinants of the profitability of banks in Hong Kong in the period from 1991 to 2005. They conclude that large banks are more cost efficient than small banks. Sufian (2009) analyses the factors that affect the profitability of state-owned and joint-stock commercial banks in China in the period from 2000 to 2007. Their results suggest that large banks and banks with higher levels of capital are more profitable. Their findings suggest operating cost and liquidity have a negative impact on the profitability of banks. They report that banks in China perform better during periods of high economic growth and inflationary periods. Using data for Greek banks for the period from 1985 to 2001, Athanasoglou et al. (2008) suggest that size did not have any impact of the profitability of these banks. They report that well capitalised banks are more capable of dealing with the negative shocks than banks with a low capital base in Greece. Other findings include that size and ownership structure did not impact on profitability but that banks performed best during periods of high

economic growth. Using survey data of 112 Chinese banks Shih, Zhang and Liu (2007) find that size did not affect profitability. They further report that joint-stock banks in China perform better than state-owned banks and city commercial banks. They argue that many of the joint-stock banks are publicly listed and have local and foreign shareholders, therefore, they are not liable to provide policy loans. On the other hand, state-owned banks are more prone to policy loans. Using data from Chinese banks in the period from 1997 to 2004, García-Herrero, Gavilá, and Santabárbara (2009) find that the concentration of assets in a few large government-owned banks is one of the key reasons for the low profitability of banks in China. Tan and Floros (2012b) investigate the determinants of the profitability of Chinese banks in the period from 2003 to 2009. They also find that banks perform best when assets are not concentrated in a small number of institutions. Seenaiah, Rath, and Samantaraya (2015) [6] and Kaur (2013) [7] investigate the determinants of the profitability of banks in India. The findings of both studies suggest that banks with high non-performing loans and high costs of deposits are less profitable than other banks. Non-performing loans erode the profitability as these are potential losses and banks may have to write-off these loans in the income sheet as per their write-off policy. On the other hand, high cost of deposits reduces the net interest income of the banks which has a negative impact on bottom line.

3.4.2 Cross-Country Studies

Mirzaei et al. (2013) investigate the factors influencing the profitability of banks in 40 emerging and advanced markets in the period from 1999 to 2008. They report some consistent and some inconsistent results across emerging and advanced

[6] Period covered 1995 to 2012
[7] Period covered 1991 to 2012

markets. Their results suggest a positive relationship between bank size on and the profitability of banks in advanced markets but a negative effect on the profitability of banks in emerging markets. Further, they suggest that overheads increase non-interest expense and had a negative impact on the profitability of banks in both types of economies, while increase in amount of bank loans had a positive impact on the profitability of banks in both economies. Pasiouras and Kosmidou (2007) investigate the determinants of the profitability of domestic and foreign banks in 15 EU countries in the period from 1995 to 2001. They find a positive relationship between capital ratio and the profitability of both domestic banks and foreign banks, and a negative impact of both increases in cost to income ratio[8] and increased bank size on the profitability of both types of banks. Their results suggest that the impact of macroeconomic variables on the profitability of banks vary across domestic and foreign banks. They find that increases to inflation had a positive impact on the profitability of domestic banks but a negative impact on the profitability of foreign banks. Similarly, they report a positive effect of GDP growth on the profitability domestic banks, however, GDP growth had a negative on the profitability of foreign banks. Using data for 90 banks in Europe, North America and Australia for the period from 1972 to 1981, Bourke (1989) reports that banks with high capital ratios and high liquidity ratios were more profitable than their competitors. Using data from 80 countries for the period from 1988 to 1995, Demirgüç-Kunt and Huizinga (1999) reports that banks with high capital ratios were more profitable than banks with low capital ratios. They further report that banks with high loan to assets ratios were less profitable than their competitors. The possible explanation is high loan to total assets ratio increase non-performing loans which reduces the profitability of

[8] High level of costs increases non-interest expense and reduces the profitability.

banks. They also find a negative impact of overhead to assets ratios on the profitability of banks. Their findings suggest that banks perform better during periods of high inflation and high interest rates. Molyneux and Thornton (1992) examine the determinants of bank performance across 18 European countries in the period from 1986 to 1989. They report a positive relationship between bank concentration and bank profitability. Their results suggest that bank ownership does not have any impact on the profitability of banks.

3.4.3 Studies of Islamic Banks

In the literature that focuses the determinants of the profitability of Islamic banks, the variables that are found to have a significant impact on profitability are similar to the variables that have been found to have a significant impact on the profitability of conventional banks.

Bashir (1999) investigates the determinants of the profitability of Islamic banks in Sudan in the period from 1979 to 1983. Bashir suggests that bank size is a key determinant of profitability in Islamic banks in Sudan, and argues that large size helps banks to diverify their products and increase profitability. Masood and Ashraf (2012) investigate the determinants of the profitability of Islamic banks in 12 countries in the period from 2006 to 2010. Their results suggest that large banks, banks with high liquidity and banks with low rates of non-performing loans, are more profitable than their competitors. They suggest that inflation and GDP growth do not affect the profitability of Islamic banks. Haron (1996) investigates the determinants of the profitability of Islamic banks in six countries 1982 and 1994. Haron's results suggest that an increase in bank size leads to a decrease in the profitability of Islamic banks. In relation to macroeconomic variables, Haron suggests that banks perform better when interest rates are high and inflation rates

are low. Hassan and Bashir (2003) investigate the factors influencing the profitability of Islamic banks in 21 countries in the period from 1994 to 2001. Their results suggest that large size does not help banks to improve profitability. They report that banks with high capital ratios are more profitable, and banks with high loan to asset ratios are less profitable. They find that Islamic banks perform better during periods of high economic growth. Using data for eight Islamic banks in the Middle East for the period from 1993 to 1998, Bashir (2003) also finds that high capital ratios had a positive impact on profitability. Bashir argues that banks with high capital ratios have the ability to attract low-cost funding which leads to an increase in profitability. Rashid and Jabeen (2016) compare the determinants of the profitability of banks in Pakistan in the period from 2006 to 2012. They report that increases to the cost to income ratio had a negative impact on the profitability of both Islamic and conventional banks. Their results suggest that bank size is not a predictor of the profitability of Islamic or conventuional banks in Pakistan. They argue that GDP growth reduces the profitability of banks.

3.5 Dependent and Independent Variables

This section provides the discussion on common dependent and independent variables used in previous studies.[9]

3.5.1 Dependent Variables

In most of the studies discussed above, bank profitability is measured by return on assets (ROA) and return on equity (ROE). Minh To and Tripe (2002), (Athanasoglou et al., 2008), Mirzaei et al. (2013) and Dietrich and Wanzenried (2014) use ROA and ROE as measures of profitability in their studies. Some

[9] Please refer to Section 4.4 in Chapter 4for the variables that are used in our study and their expected impact.

researchers have also used return on deposits (ROD) and net interest margin (NIM). For example, Bashir (1999) uses ROD as a measure of profitability and Hassan and Bashir (2003) use NIM to investigate the determinants of the profitability of banks.

3.5.2 Independent Variables

Prior researchers have explained the profitability of banks as being a function of internal and external variables (Dietrich & Wanzenried, 2011). Internal variables are classified as bank-specific factors. External variables are classified as industry-specific variables and macroeconomic variables. This section discusses the common variables used in the literature.

Bank-Specific Determinants of the Profitability of Banks

Non-performing loan ratio (NPLR)/Loan loss provisions to total loans ratio (LLPR):

NPLR and LLPR are used as measures of credit quality in the literature. NPLR is the ratio of non-performing loans to total loans expressed as a percentage. In most of the countries, loans are classified as non-performing loans when they are overdue by 90 days or more. NPLR is widely used as a measure of credit quality. LLPR is the ratio of loan loss provisions to total loans expressed as a percentage. Loan loss provision is an expense that banks set aside as an allowance for potential loan losses/non-performing loans. Banks in every country need to follow the Central bank policies associated with making provisions for bad loans. In our study, we have used NPLR because it is a better measure to determine profitability as it considers all the bad loans which are overdue by 90 days. On the other hand, LLPR only takes into account the loans which are set aside as a potential loss.

Prior research suggests that banks with high levels of non-performing loans have poor quality loan portfolios. Athanasoglou et al. (2008) and Dietrich and Wanzenried (2014) use loan loss provisions over total loans as a proxy for credit

quality and find that credit quality has a significant negative effect on the profitability of banks. Similarly, Akhtar, Ali, and Sadaqat (2011) and Tan et al. (2017) find that NPLR has a negative effect on the profitability of banks in India and China, respectively.

Capital adequacy ratio (CAR): The CAR is measured as the ratio of tier-1 and tier-2[10] capital to risk-weighted assets expressed as a percentage. The Basel Accords require banks to maintain a minimum CAR to assist them to absorb losses. A minimum CAR also protects depositors and brings stability to the financial system of a country. Many researchers find a relationship between capital ratio and bank profitability, but the direction of this relationship is still uncertain. Berger (1995a) argues that the banks with high capital require less debt finance which reduces their interest expense and increase their earnings. Further, well-capitalised banks are considered safe and are able to attract low-cost deposits, which make them more profitable than banks with low capital (Bourke, 1989). Lee and Hsieh (2013) also suggest high level of capital reduces risk and increase profitability. On the other hand, the requirement of capital limits the lending ability of banks which may lower the profitability of the banks. Further higher capital reduces the tax shield which may result reduction in profits. Athanasoglou et al. (2008) argue that banks with adequate capital are more profitable than their competitors. Their findings suggest that a high level of capital helps banks to absorb negative economic shocks. Similarly, Berger (1995a) also find a positive link between capital and profitability in US. Their findings suggest that banks with high capital do not require to borrow funds at a higher cost which increases their profitability. On the other hand, Dietrich

[10] Tier-1 capital referred to as a core capital that includes equity and disclosed reserves. Tier-2 capital is supplementary capital that also includes loan-loss reserves, revaluation reserves and undisclosed reserves.

and Wanzenried (2011) find a negative impact of capital ratio on the profitability of banks in Switzerland. Their findings suggest that well-capitalised banks in Switzerland attracted low-cost deposits during GFC. However, they could not utilise those deposits for profitable investments due to the low demand for bank loans.

Total assets (SIZE): Most previous studies have used total assets as a measure of bank size. Dietrich and Wanzenried (2011) suggest that large banks benefit from economies of scale and have more flexibility in diversifying their loan products but at the same time they are likely to have higher agency costs. Berger, Hunter and Timme (1993) suggest that the larger banks are more capable to achieve high-value output; therefore, they are more X-efficient than smaller banks. Hughes and Mester (2013) found a positive relationship between economies of scale and bank size. Their results that large banks benefit from economies of scale due to technical advantage associated with diversification and spreading of information costs that do not increase with the increase in size. Smirlock (1985), Pasiouras and Kosmidou (2007) and Abduh and Idrees (2013) find a positive effect of SIZE on the profitability of banks in the US, Europe and Malaysia, respectively. In contrast, Athanasoglou et al. (2008) and Tan and Floros (2012a) find that SIZE had a negative impact on the profitability of banks in Greece and China, respectively. Berger, Hanweck, and Humphrey (1987) and Micco et al. (2007) stand in the middle of these other findings by arguing that the size of banks is not correlated with profitability.

Liquidity (LIQ): Loan to deposit ratio (LDR) and loan to asset ratio (LAR) are the two common proxies used to measure liquidity in the literature. A bank with low LDR/LAR is highly liquid but may also possibly be associated with lost lending

opportunities (Kosmidou, Pasiouras, Zopounidis, & Doumpos, 2006). On the other hand, a bank with high LDR/LAR is less liquid but can be more profitable as they have lent out larger amounts in loans which has a potential to increase interest income and profitability. Hence it is not surprising that the literature has mixed findings with respect to the relationship between liquidity and bank profitability. Tan and Floros (2012a) use LAR as a proxy for liquidity. Their findings suggest that liquid banks are less profitable than their competitors. Heffernan and Fu (2010) use the same proxy to measure liquidity but their results suggest that liquid banks are more profitable. Pasiouras and Kosmidou (2007) use LDR as a measure of liquidity and conclude that higher levels of liquidity reduce the profitability of domestic banks in Europe and increase the profitability of foreign banks.

Off-balance sheet items (OFFBS): In the literature, off-balance sheet activities are measured as a ratio of off-balance sheets items to the total assets of the bank. Off-balance sheet items include contingent items such as guarantees, derivatives and commitments which are sources that generate non-interest income. However, there are bank-specific and foreign exchange risks associated with off-balance sheet items (Shanmugam & Das, 2004). Demirgüç-Kunt and Huizinga (2010) report a positive relationship between OFFBS and bank profitability. However, Mirzaei et al. (2013) report a negative relationship between OFFBS and bank profitability in advanced markets. From the literature it appears that there is a relationship between OFFBS and bank profitability but the direction of this relationship is uncertain.

Cost to income ratio (COST): COST is used as a measure of operating efficiency in the literature. It is the ratio of operating costs to total income expressed as a percentage (Tripe, 1998). It is almost certain from the literature that COST has a negative impact on the profitability of banks. Akhtar et al. (2011), Athanasoglou et

al. (2008), Mirzaei et al. (2013) and Dietrich and Wanzenried (2014) all report a negative effect of overheads on the performance of banks.

Market share (SHARE): Prior studies have used market share as an independent variable to determine its effect on the profitability of banks. Smirlock (1985) suggests that market share has a positive impact on the profitability of banks. Mirzaei et al. (2013) uses market share as an explanatory variable to determine the profitability of banks in emerging and advanced markets. They find a positive impact of market share on the profitability of banks in advanced markets but the impact is insignificant in emerging markets.

Bank age (AGE): Bank age is another variable examined in prior studies as a possible determinant of profitability. Dietrich and Wanzenried (2009) conclude that bank age does not predict the profitability of banks. In contrast, Mirzaei et al. (2013) suggest a negative relationship between bank age and profitability in emerging economies and a positive relationship in advanced economies. From the existing literature, the direction of this relationship is uncertain.

Industry-Specific Determinants of the Profitability of Banks

Bank ownership and concentration are the common industry-specific variables employed in studies.

Bank Ownership (OWN): Bank ownership is also examined as a possible predictor of the profitability of banks in the literature. Many studies have examined the impact of ownership on bank performance.

Most of the existing studies show that state-owned banks are less efficient; they have high level of non-performing loans due to different objectives associated with development of specific industries and promoting exports (Berger, Clarke, Cull,

Klapper and Udell, 2005); have higher operating costs due to over staffing; and have outdated technology (Iannotta et al.; 2007 and Dietrich and Wanzenried; 2009). Short (1979) suggests that ownership has a significant effect on the profitability of banks. However, others argue that ownership does not have any effect on profitability (Bourke, 1989; Molyneux & Thornton, 1992). Micco et al. (2007) argue that state-owned banks are less profitable because of high operating costs. Iannotta et al (2007) also suggest that state-owned banks are less profitable than private banks but they suggest that it is because of their poor credit quality. Regarding foreign and local banks, the results are mixed. Foreign banks have potential to take advantage of their access to capital markets, their ability to attract clients across the world and their superior technology. On the other hand, they have to face many challenges associated with economic and regulatory environments. Further, some countries (such as China) has stringent requirements for foreign banks that affect their profitability. Dietrich and Wanzenried (2009) find that foreign banks in Switzerland less profitable than domestic banks. On a contrary, Bonin, Hasan and Wachtel (2005) conclude that foreign banks are more profitable in emerging economies.

Concentration ratio (CONC): Most prior studies have measured concentration ratio as the assets of few largest banks to total assets of industry. The efficient-structure (ES) hypothesis suggests that efficient firms capture a large market share through comparative advantage which increases their market concentration and leads to higher profitability (Peltzman, 1977). However, there are mixed empirical findings on the effect of concentration ratio on the profitability of banks. Both Bourke (1989) Molyneux and Thornton (1992) find a positive impact of bank concentration on the profitability of banks, which is in line with ES hypothesis. Fu, Lin and Molyneux

(2014) also suggest the higher concertation leads to a lower competition. Hence, banks with high concentration have potential to increase their profitability. On the other hand, Mirzaei et al. (2013) report a negative impact of concentration ratio on the profitability of banks. Their findings suggest that a high concentration encourages risk-talking behaviour and reduces profitability. Berger (1995b) suggest that the impact of concentration on bank profitability is positive if market share is excluded but with the inclusion of market share it becomes negative. They conclude that relationship between concentration and bank profitability is spurious and it is a result of correlations with market share and other variables.

Macroeconomic Determinants of the Profitability of Banks

External variables found to have an effect on the profitability of banks include the inflation rate, gross domestic product and interest rates.

Inflation (INF): Revell (1979) argues that the impact of inflation on the profitability of banks depends on the rate of increase in their operating costs. If banks are able to forecast the inflation rate, they can control their operating costs accordingly. Demirgüç-Kunt and Huizinga (1999) and Athanasoglou et al. (2008) find a positive effect of inflation on the profitability of banks. Tan (2016) suggests that inflation has a positive impact on the profitability of banks in China. On the other hand, Mirzaei et al. (2013) concludes that inflation has a negative impact on the profitability of banks in both emerging and advanced markets.

Interest rates (INT): The common proxies used in the literature to measure interest rates are government debt rate, short-term market rate and policy rate. Policy rate is a monetary policy tool that central banks use to either promote or reduce the level of economic activity in a country. When central banks increase interest rates, banks usually improve their spreads by increasing lending rates by more percentage points

than they do deposit rates (Demirgüç-Kunt & Huizinga, 1999; Maudos & De Guevara, 2004).

Most of the studies find a positive relationship between interest rates and profitability of the banks irrespective of proxies used to measure interest rates. Short (1979) reports a significant positive relationship between interest rates and the profitability of banks in Canada, Western Europe and Japan. Similarly, Bourke (1989) finds a positive relationship between interest rates and the profitability of banks in Europe, North America and Australia. However, Dietrich and Wanzenried (2009) find that interest rates do not have any impact on the profitability of banks in Switzerland.

GDP growth (GDP): Cyclical trends can have a significant effect on the profitability of banks. For example, during recessionary periods, businesses are unlikely to grow, which may reduce the demand for loans. The reduced demand for loans has the potential to decrease the profitability of banks. On the other hand, businesses are more likely to expand during boom times, which may increase the loan portfolios of banks, thereby increasing bank profits. Most studies suggest that banks perform better during high growth periods. For example, Athanasoglou et al. (2008) find a positive relationship between GDP growth and the profitability of banks in Greece. Similarly, Mirzaei et al. (2013) find a positive relationship between GDP growth and bank profitability in emerging and advanced economies.

Summary

It is evident from the literature that bank-specific, industry-specific and macroeconomic variables have a significant effect on the profitability of banks. However, it seems that empirical results vary widely as a result of cross-country differences and the use of different datasets.

3.6 Conclusion

The review of the literature shows that there are at least two research gaps. First, the existing literature provides evidence of the significant impact of financial sector development on economic growth. In the literature, the most common proxy used for financial sector development is domestic credit to the private sector. Some researchers have also used other proxies such as bank loans, bank deposits, money supply and bank claims. One study by Cole, Moshirian, and Wu (2008) focuses on the relationship between the stock returns of banks and economic growth. They find the stock returns of banks have a positive impact on economic growth. This indicates the need for a comprehensive study to investigate the extent to which bank profits affect economic growth in the Asia-Pacific region. The present study is the first one to conduct a comprehensive examination of the relationship between the profitability of banks and economic growth across a range of countries in the Asia-Pacific region which are at different stages of economic development but have similar bank regulations. The second research gap is associated with a comparative study on Islamic and conventional banks. In one of the empirical chapters, Chapter 7, we investigate the factors influencing the profitability of Islamic and conventional banks in four Asian countries with a large data set. Prior studies have investigated the determinants of profitability but very few studies have investigated the factors influencing the profitability of Islamic banks. Most of these studies are single-country studies. There are also some cross-country studies but the sample size is very small. For example, Bashir (2003) investigates the determinants of the profitability of Islamic banks in different countries in the Middle East but the sample consists of only 14 banks. Similarly, Haron (1996) and Masood and Ashraf (2012) conduct cross-country studies but their samples are 14 Islamic and 25

Islamic banks, respectively. Hassan and Bashir (2003) use a large sample of 43 Islamic banks but their study focuses only on the determinants of the profitability of Islamic banks. It does not compare the determinants of the profitability of Islamic and conventional banks. Our research, by analysing the determinants of the profitability of Islamic and conventional banks in four Asian countries, fills an important gap in the literature as it is the first study to examine the profitability of conventional and Islamic banks using a large data set drawn from four countries (i.e., Bangladesh, Indonesia, Malaysia and Pakistan).

Chapter 4: Data and Methods

This chapter provides a description of the data and explains the sources of data. It also describes the research methods that are used in our study to address the research questions and it discusses the dependent and independent variables.

4.1 Introduction

Our research is broadly divided into two parts. We start with the proposition that a well-functioning and profitable banking sector is necessary to harness the finance necessary to support economic growth (Athanasoglou et al. (2008). In our first study, we identify the extent to which bank profits affect economic growth in our ten countries. In a subsequent series of studies, we investigate what determines the profitability of banks in our sample of ten countries in the Asia-Pacific region. In order to investigate the determinants of the profitability of banks we have classified the economies in three categories: small emerging economies, large emerging economies and developed economies. We investigate whether or not the results vary across these categories. We have investigated the determinants of the profitability of banks in all ten countries together and then separately in each category.

4.2 Description and Sources of Data

We have used secondary data in both parts of the study for the period from 2004 to 2014.

In the first part of the study that investigates the relationship between the profitability of banks and economic growth in the Asia-Pacific region, we use a panel dataset of ten countries. The unit of analysis is all banks in a country in a year. Data for bank-related variables such as return on assets and bank size were collected

from the Bankscope database. The data for other variables, including GDP growth, inflation, government consumption, trade and market capitalisation were gathered from the World Bank database.

In the second part of the study, we investigate the determinants of the profitability of banks. Each country is placed in one of three categories: small emerging economies (Bangladesh, Indonesia, Malaysia and Pakistan), large emerging economies (China and India), and developed economies (Australia, Hong Kong, Japan and Singapore). The study investigates the determinants of the profitability of banks in all ten countries together and then separately in each of the categories. We used three sources to collect data: the Bankscope database, the World Bank database and the websites of central banks for each country. Data for all bank-specific and ownership variables were collected from the Bankscope database. We gathered data on cash reserve requirements and interest rates from the official websites of the central banks of each country. Data on inflation, gross domestic product, financial inclusion and other macroeconomic variables were retrieved from the World Bank database.

For both parts of the study, our dataset consisted of all active commercial banks in the ten countries investigated. In some cases there was duplicate information on a bank and both consolidated and unconsolidated information was maintained in the database. In these cases we included only the consolidated statements to avoid duplication. There were some instances where we find statements covering only part of a year (three months or six months). We excluded all those observations where Bankscope did not provide data for a complete year (12 months). There are many banks in our sample that operate in more than one countries. These banks maintain separate financial statements for each of the countries, therefore, we have

included these banks separately in every country they operate. Finally, in line with Beck, Demirgüç-Kunt, and Merrouche (2013), the variables were winsorised at 2% to reduce the impact of outliers on the results. Winsorisaton is one of the common techniques used by researchers to reduce the impact of outliers. It is a process which removes outliers from samples by assigning them a value closer to the values of other units in the sample (Ghosh & Vogt, 2012). Table 4.1 shows the names of the countries, classifications of their economies and the number of banks in each country.

Table 4.1: Countries, classification of economies and number of banks

Country Name	**Number of Banks[11]**
Small Emerging Economies	
Bangladesh	47
Indonesia	80
Malaysia	50
Pakistan	28
Large Emerging Economies	
China	159
India	58
Developed Economies	
Hong Kong	35
Singapore	12
Australia	29
Japan	138
Total	**645**

4.3 Methods

4.3.1 Ordinary Least-Square Regression (OLS) Analysis

In most studies in the literature, OLS is applied on fixed effects or random effects to deal with simultaneous causality and unobserved heterogeneity. The fixed-effects model estimates parameters for each unit that not only reduce the power of model but also result in an increase in the standard errors of the coefficient estimates.

[11] Please refer to Appendix 1 for name of banks.

The fixed-effects model creates more problems when the sample size is small because variations in the dependent variable may be caused by these unit effects (Clark & Linzer, 2015). On the other hand, the random-effect model reduces the variability within the sample by partially pooling the data. We also conducted Hausman test[12] to determine the appropriate model for the study. The results also suggested that random-effect model is more appropriate than fixed-effect model. Given this problem associated with the fixed-effects model and results of Hausman test, we have used the random-effects model.[13]

For the first part of our study we investigate the impact of the relationship between the profitability of banks and economic growth using the ordinary least-square (OLS) method (random-effects model). We have used a panel data set of ten countries for the period from 2004 to 2014. For every country, we have aggregated the information of each bank-related variable for every year.[14] Therefore, we have eleven observations for each country. The functional form of the equation used is given below:

$$GDP_{it} = \alpha + \beta_1 GDP_{i(t-1)} + \beta_2 (1 + ROA)_{it} + \beta_3 (1 + ROA)_{i(t-1)} + \beta_4 SIZE_{it} + \beta_7 INF_{it} + \beta_8 MKTCAP_{it} + \beta_9 EXP_{it} + \beta_{10} TRADE_{it} + \in_{it} \quad (4.1)$$

We run the regression on all countries together, using dummy variables for two categories – small emerging economies and developed economies. Large emerging economies are used as a reference category. In addition, we have used a dummy variable for GFC. The dummy variable will take a value of 1 if the year is 2008 or 2009 and 0 otherwise. We have selected the years 2008 and 2009 as the GFC period

[12] Results are not reported but are available on request.
[13] In order to confirm the results we also used the fixed-effects model and the pooled regression method. We found largely consistent results across all three methods. Hence for ease of exposition, we only report the results obtained with the random-effects model.
[14] For example, we have added the assets of all the banks in a country for every year to measure bank size.

because these are the years when the GFC had an obvious negative impact on the economic growth of our ten countries.

The regression equation that we used is set out below:

$$GDP_{it} = \alpha + \beta_1 GDP_{i(t-1)} + \beta_2(1 + ROA)_{it} + \beta_3(1 + ROA)_{i(t-1)} + \beta_4 SIZE_{it} + \beta_7 INF_{it} + \beta_8 MKTCAP_{it} + \beta_9 EXP_{it} + \beta_{10} TRADE_{it} + GFCDummy + smallemergingDummy + developedDummy + \in_{it} \quad (4.2)$$

where:

the subscript i refers to the country and t refers to time period;

GDP is the GDP growth for country i;

(1+ROA) is the measure of profitability of banks in country i;

SIZE refers to the percentage change in the size of the banking sector in country i;

INF refers to the inflation rate of country i;

MKTCAP refers to the percentage change in the stock market capitalisation of country i;

EXP refers to the percentage change in the government expenditure of country i;

TRADE refers to the percentage change in the sum of exports and imports of country i;

GFCdummy is the dummy variable for the GFC;

smallemergingDummy is the dummy variable for small emerging economies;

developedDummy is the dummy variable for developed economies; and

$\in_{it}$ is the error term.

There are four chapters in this thesis that investigate the determinants of the profitability of banks (Chapter 6, 7, 8 and 9). We investigate the determinants of the profitability of banks in all ten countries together first, and then separately in each of the categories (small emerging economies, large emerging economies and developed economies). In order to investigate the determinants of the profitability of banks, we use ordinary least-square (OLS) incorporating random effects. We use a dummy variable for GFC. The dummy variable will take the value 1 if the year is 2008 or 2009 and 0 otherwise. We have selected the years 2008 and 2009 as GFC period. We have selected year 2008 and 2009 as GFC period because these are the years when the GFC had an obvious negative impact on the economic growth in the countries. The regression equation is given below:

$$\pi_{it} = \alpha + \sum_{j=1}^{J} \beta_j X_{it}^{j} + \sum_{l=1}^{L} \beta_l X_{it}^{l} + \sum_{m=1}^{M} \beta_m X_{it}^{m} + \sum_{n=1}^{N} \beta_n X_{it}^{n} + \in_{it} \quad (4.3)$$

where:

π_{it} is a measure of the profitability of bank i at time t with i=1, … N and t=1, … T;

α is a constant term;

X_{it}^{j} indicates bank-specific explanatory variables;

X_{it}^{l} refers to industry-specific variables;

X_{it}^{m} indicates macroeconomic variables;

X_{i}^{n} refers to the dummy variable for GFC; and

$\in_{it}$ is the error term.

In Chapter 6, we investigate the determinants of the profitability of the banks in all ten countries together. We use dummy variables for small emerging and large emerging economies while developed economies are used as a reference category.

The regression equation that we used is set out below:

$$\pi_{it} = \alpha + \sum_{j=1}^{J} \beta_j X_{it}^{j} + \sum_{l=1}^{L} \beta_l X_{it}^{l} + \sum_{m=1}^{M} \beta_m X_{it}^{m} + \sum_{n=1}^{N} \beta_n X_{i}^{n} + \sum_{p=1}^{P} \beta_p X_{i}^{p} + \in_{it} \quad (4.4)$$

where π_{it} is a measure of the profitability of bank i at time t with i=1, … N and t=1, … T, α is a constant term, X_{it}^{j} indicates bank-specific explanatory variables, X_{it}^{l} refers to industry-specific variables, X_{it}^{m} indicates macroeconomic variables X_{i}^{n} refers to a dummy variable for GFC and X_{i}^{p} refers to a dummy variable for the economic category.

In Chapter 7, we investigate the determinants of the profitability of Islamic and conventional banks in Bangladesh, Indonesia, Malaysia and Pakistan. We use a dummy variable for Islamic banks and dummy variables for the three countries (Bangladesh, Indonesia and Malaysia) while Pakistan is used as a reference country. The relationship is investigated using the following equation:

$$\pi_{it} = \alpha + \sum_{j=1}^{J} \beta_j X_{it}^{j} + \sum_{l=1}^{L} \beta_l X_{it}^{l} + \sum_{m=1}^{M} \beta_m X_{it}^{m} + \sum_{n=1}^{N} \beta_n X_{it}^{n} + \sum_{p=1}^{P} \beta_p X_{i}^{p} + \sum_{q=1}^{Q} \beta_q X_{i}^{q} + \in_{it} \quad (4.5)$$

where π_{it} is a measure of the profitability of bank i at time t with i=1, … N and t=1, … T, α is a constant term, X_{it}^{j} indicates bank-specific explanatory variables, X_{it}^{l} refers to industry-specific variables, X_{it}^{m} indicates macroeconomic variables, X_{i}^{n} refers to the dummy variable for GFC, X_{i}^{P} refers to the dummy variable for Islamic banks, X_{i}^{q} is the dummy variable for each country and $\in_{it}$ is the error term.

In Chapter 8, we investigate the factors influencing the profitability of banks in India and China. We have used a dummy variable for foreign banks. We run the regressions on India and China separately using the following equation:

$$\pi_{it} = \alpha + \sum_{j=1}^{J} \beta_j X_{it}^{j} + \sum_{l=1}^{L} \beta_l X_{it}^{l} + \sum_{m=1}^{M} \beta_m X_{it}^{m} + \sum_{n=1}^{N} \beta_n X_{i}^{n} + \sum_{p=1}^{P} \beta_p X_{i}^{p} + \in_{it} \quad (4.6)$$

where π_{it} is a measure of the profitability of bank i at time t with i=1, … N and t=1, … T, α is a constant term, X_{it}^{j} indicates bank-specific explanatory variables, X_{it}^{l} refers to industry-specific variables, X_{it}^{m} indicates macroeconomic variables, X_{i}^{n} refers to the dummy variable for GFC and X_{i}^{p} refers to the dummy variable for foreign banks.

In Chapter 9, we investigate the profitability of banks in developed economies. We have used dummy variables for three countries (Australia, Hong Kong and Singapore) while Japan is used as a reference country. The relationship is investigated using following equation:

$$\pi_{it} = \alpha + \sum_{j=1}^{J} \beta_j X_{it}^{j} + \sum_{l=1}^{L} \beta_l X_{it}^{l} + \sum_{m=1}^{M} \beta_m X_{it}^{m} + \sum_{n=1}^{N} \beta_n X_{i}^{n} + \sum_{p=1}^{P} \beta_p X_{i}^{p} + \in_{it} \quad (4.7)$$

where π_{it} refers to a measure of the profitability of bank i at time t with i=1, … N and t =1, … T, α is a constant term, X_{it}^{j} indicates bank-specific explanatory variables, X_{it}^{l} refers to industry-specific variables, X_{it}^{m} indicates macroeconomic variables, X_{i}^{n} refers to dummy variable for GFC and X_{i}^{p} refers to dummy variables for countries.

In all the above cases, we run regressions on bank-specific variables first, and then we add industry-specific variables and finally we add macroeconomic variables to check whether the explanatory power of model increases with the addition of industry-specific and macroeconomic variables.

4.3.2 Nonlinear Regression Analysis

In order to investigate a possible nonlinear relationship between bank profitability and economic growth, the banking sector in each country is divided into large and small banks based on the 11-year median result (2004–2014) for the ratio of total assets to population for each country. If the median value of total assets to population ratio is greater than 7%, the banking sectors are classified as large and if the median value is less than 7%, the banking sectors are classified as small. Based on the median results, the large banking sectors are: Australia, Japan, Hong Kong and Singapore; and the small banking sectors are Bangladesh, China, India, Indonesia, Malaysia and Pakistan.[15] The nonlinear relationship is investigated using the following equation:

$$GDP_{it} = \alpha + \beta_1 GDP_{i(t-1)} + \sum_j^J \beta_1 X_{it}^j + \sum_{j=1}^J \beta_2 \mathrm{D}_1 X_{it}^J + \sum_{l=1}^L \beta_l X_{it}^l + \in_{it} \quad (4.8)$$

where X_{it}^j refers to bank main explanatory variables, and X_{it}^l refers to variables related to macroeconomic and stock market capitalisation. $D_1.X_{it}$ is the difference between the coefficient values for small banking sectors and large banking sectors. D_1 will take the value of 1 if the banking sectors are large and 0 if the banking sectors are small. The sum of X_{it} and $D_1.X_{it}$ is the coefficient for the explanatory variables for large banking sectors. Wald tests will be performed to check the joint significance of the variables.

4.3.3 Wald Tests

Relationship between the profitability of banks and economic growth

In order to test for any difference between the impact of the explanatory variables on economic growth across the three types of economies, we use the following equation:

[15] Please refer to Appendix 3 for calculations.

$$GDP_{it} = \alpha + \beta_1 GDP_{i(t-1)} + \sum_j^J \beta_1 X_{it}^j + \sum_{j=1}^J \beta_2 \mathrm{D}_1 X_{it}^J + \sum_{j=1}^J \beta_3 \mathrm{D}_2 X_{it}^J + \sum_{l=1}^L \beta_l X_{it}^l + \in_{it} \quad (4.9)$$

We use Equation 4.9 to analyse the differing impacts of bank-related explanatory variables on economic growth across the three categories.

X_{it}^j refers to bank main explanatory variables, and X_{it}^l refers to variables related to macroeconomic and stock market capitalisation. $D_1.X_{it}$ is the difference between the coefficient values for developed and small emerging economies and $D_2.X_{it}$ is the difference between the coefficient values for developed and large emerging economies. D_1 will take the value of 1 if economies are small emerging economies and 0 otherwise. D_2 will take the value of 1 if economies are large emerging economies and 0 otherwise. The sum of X_{it} and $D_1.X_{it}$ is the coefficient for the explanatory variables for small emerging economies and the sum of X_{it} and $D_2.X_{it}$ is the coefficient for the explanatory variables for large emerging economies. Wald tests will be performed to check the joint significance of the variables.

Determinants of the profitability of banks

Islamic and Conventional Banks

In order to examine the difference between the determinants of profitability across Islamic and conventional banks, we use the following equation:

$$\pi_{it} = \alpha + \sum_j^J \beta_1 X_{it}^j + \sum_{j=1}^J \beta_2 \mathrm{D}_1 X_{it}^J + \sum_{l=1}^L \beta_l X_{it}^l + \sum_{m=1}^M \beta_m X_{it}^m + \in_{it} \quad (4.10)$$

where X_{it}^j refers to bank-specific explanatory variables, X_{it}^l refers to industry-specific variables and X_{it}^m indicates macroeconomic variables.

We use Equation 4.10 to analyse the differing impacts of the bank-specific explanatory variables on bank profitability across Islamic and conventional banks. The dummy variable, D_1, will take the value of zero if the bank is Islamic and a value of 1 if the bank is conventional. The coefficient β_1 is the coefficient for

Islamic banks and the coefficient β_2 is the coefficient for the difference between the profitability of Islamic banks and conventional banks. Hence, in order to obtain the coefficient for conventional banks we will add β_1 and β_2 and use the Wald test to the joint significance of the variables.

Given that the Malaysian Islamic banking sector is larger than the Islamic banking sectors in Bangladesh, Indonesia and Pakistan, we further split the sample to investigate the impact of bank-specific variables across all Islamic banks (except Malaysia) and all conventional banks (except Malaysia). In this case, D_1 will take a value of zero if the banks are Islamic banks of all countries except Malaysia, and D_1 will take a value of 1 if the banks are conventional banks from all countries except Malaysia. The coefficient β_1 is the coefficient for all Islamic banks (except Malaysia) and the coefficient β_2 is the coefficient for the difference between all Islamic banks (except Malaysia) and all conventional banks (except Malaysia). Hence, in order to obtain the coefficient for all conventional banks (except Malaysia) we will add β_1 and β_2 and use the Wald test to determine the joint significance of the variables.

Indian and Chinese Banks

In order to examine the difference between the determinants of profitability in Indian and Chinese banks, both in aggregate and when the banks are separated on the basis of whether they are local or foreign banks, state-owned or private banks, and whether the period being studied lay inside or outside the GFC, we use the following equation:

$$\pi_{it} = \alpha + \sum_j^J \beta_1 X_{it}^j + \sum_{j=1}^J \beta_2 \mathrm{D}_1 X_{it}^J + \sum_{l=1}^L \beta_l X_{it}^l + \sum_{m=1}^M \beta_m X_{it}^m + \in_{it} \quad (4.11)$$

where X_{it}^{j} refers to bank-specific explanatory variables, X_{it}^{l} refers to industry-specific variables and X_{it}^{m} indicates macroeconomic variables.

We use Equation 4.11 to analyse the differing impacts of the bank-specific explanatory variables on bank profitability in India and China. The dummy variable, D_1, will take the value of zero if the bank is Indian and a value of 1 if the bank is Chinese. The coefficient β_1 is the coefficient for Indian banks and the coefficient β_2 is the coefficient for the difference between the profitability of Indian and Chinese banks. Hence, in order to obtain the coefficient for Chinese banks we will add β_1 and β_2 and use the Wald test to determine their significance.

The same approach is used when we examine the impacts of bank-specific variables on bank profitability for the following three subsamples within India and within China:

1. Local banks and foreign banks: In this case D_1 takes on the value of zero for a local bank and zero if it is a foreign bank. The coefficient β_1 measures the impact of the variable on local banks and β_1 plus β_2 measures the impact on foreign banks.
2. State-owned banks and private banks: In this case D_1 takes on the value of zero for a state-owned bank and zero if it is a private bank. The coefficient β_1 measures the impact of the variable on state-owned banks and β_1 plus β_2 impact on private banks.
3. Performance during the GFC (2008 and 2009) and non-GFC periods: In this case D1 will take on the value of zero if the year is 2008 or 2009 and a value of 1 for the other years. The coefficient β_1 measures the impact of the variable in the GFC period and β_1 plus β_2 measures the impact during the GFC years.

Japan and Other Developed Economies (Australia, Hong Kong and Singapore)

In terms of total assets and number of banks, the Japanese banking sector is the largest of all the developed countries examined in this thesis. We split the sample and examine how the impacts of the determinants of profitability vary across Japan and the other three developed economies using the following equation:

$$\pi_{it} = \alpha + \sum_j^J \beta_1 X_{it}^j + \sum_{j=1}^J \beta_2 \mathrm{D}_1 X_{it}^J + \sum_{l=1}^L \beta_l X_{it}^l + \sum_{m=1}^M \beta_m X_{it}^m + \in_{it} \quad (4.12)$$

where X_{it}^j refers to bank-specific explanatory variables, X_{it}^l refers to industry-specific variables and X_{it}^m indicates macroeconomic variables.

We use Equation 4.12 to analyse the differing impacts of the bank-specific explanatory variables on bank profitability across Japan and the other three developed economies. The dummy variable, D_1, will take the value of zero if the country is Japan and a value of 1 for all other developed economies. The coefficient β_1 is the coefficient for Japan and the coefficient β_2 is the coefficient for the difference between the profitability of banks in Japan and the profitability of banks in the other three developed economies. Hence, in order to obtain the coefficient for other developed economies we will add β_1 and β_2 and use the Wald test to determine the joint significance of the variables.

Small Emerging, Large Emerging and Developed Economies

In order to examine the difference between the determinants of profitability across the three types of economies, we use the following equation:

$$\pi_{it} = \alpha + \sum_j^J \beta_1 X_{it}^j + \sum_{j=1}^J \beta_2 \mathrm{D}_1 X_{it}^J + \sum_{j=1}^J \beta_3 \mathrm{D}_2 X_{it}^J + \sum_{l=1}^L \beta_l X_{it}^l + \sum_{m=1}^M \beta_m X_{it}^m + \in_{it} \quad (4.13)$$

where X_{it}^j refers to bank-specific explanatory variables, X_{it}^l refers to industry-specific variables and X_{it}^m indicates macroeconomic variables.

$D_1.X_{it}$ is the difference between the coefficient values for developed and small emerging economies and $D_2.X_{it}$ is the difference between the coefficient values for developed and large emerging economies. D_1 will take the value of 1 if economies are small emerging and 0 otherwise. D_2 will take the value of 1 economies are large emerging and 0 otherwise. The sum of X_{it} and $D_1.Xit$ is the coefficient for the explanatory variables for small emerging economies and the sum of X_{it} and $D_2.X_{it}$ is the coefficient for the explanatory variables for large emerging economies. Wald tests will be performed to check the joint significance of the variables.

4.3.4 Granger Causality Test

In order to determine the causal relationship between the bank profitability and economic growth, we used the Granger causality test. This test was proposed by Clive Granger in 1969. The following equations will be used to test for causal relationships:

$$GDP_{it} = \alpha + \beta_1(1 + ROA)_{i(t-K)} + \beta_2 GDP_{i(t-K)} + \in_{it} \quad (4.14)$$

$$(1 + ROA)_{it} = \alpha + \beta_2(1 + ROA)_{i(t-K)} + \beta_4 GDP_{i(t-K)} + \in_{it} \quad (4.15)$$

The null hypothesis is that there is no causal relationship between bank profitability and economic growth. Equations 4.14 and 4.15 test for the following hypotheses:

a) There will be a unidirectional causality from bank profitability to economic growth if the coefficient for the lagged value of bank profitability is statistically different from zero and the coefficient for the lagged value of GDP is not statistically significant ($\beta_1 \neq 0$ and $\beta_4 = 0$).

b) There will be a unidirectional causality from economic growth to bank profitability if the coefficient for lagged value of GDP is statistically different

from zero and the coefficient for the lagged value of bank profitability is not statistically significant ($\beta_4 \neq 0$ and $\beta_1 = 0$).

c) There will be a bi-directional causality between bank profitability and economic growth if the coefficient for the lagged value of GDP and the coefficient for the lagged value of bank profitability are statistically different from zero ($\beta_1 \neq 0$ and $\beta_4 \neq 0$.

d) There will be a no causal relationship between bank profitability and economic growth if the coefficient for the lagged value of GDP and the coefficient for the lagged value of bank profitability are not statistically different from zero ($\beta_1 = 0$ and $\beta_4 = 0$).

4.4 Dependent and Independent Variables

Relationship between the profitability of banks and economic growth

This section sets out the dependent and independent variables that we have used to investigate the relationships between the profitability of banks and economic growth.

Our independent variable is annual GDP growth (%) which is one of the most widely used indicators of economic growth. Law and Singh (2014), Cole et al. (2008) and Önder and Özyıldırım (2013) use GDP growth to establish a link between financial sector development and economic growth. Our independent variables are also selected from a wide range of variables previously used in the literature. We have classified them into two categories: main variables and control variables. The key variables include the lagged value of GDP growth, profitability and the size of the banking sector. The control variables include a number of macroeconomic variables and one variable to capture the size of the stock market. Expected signs are determined on the basis of the empirical findings of previous

studies and/or on the basis of intuition. It is important to note that our key explanatory variable, bank profitability, has not been used in previous studies. Klein and Weill (2017) suggest that the profitability of banks is important for financial stability, and a stable financial system plays an important role in economic growth. Therefore, we expect a positive relationship between bank profitability and economic growth.

Table 4.2 provides a summary of the dependent and independent variables and includes their notations, how they are measured and their expected effects. In order to take account of the possibility that bank profitability might not have an immediate impact on economic growth, we have included ROA in periods t and (t-1) as independent variables.

Table 4.2: Definition, notation and expected effect of the variables

Variables	Notation	Measure	Expected Sign
Dependent Variable			
Gross domestic product	GDP	Annual GDP growth rate (%)	
Independent Variables			
Key Variables			
Lagged gross domestic product	Lag GDP	Lagged value of annual GDP growth rate (%)	+
Return on assets	ROA	(1+Profit before tax/Total assets)	+
Lagged (1+ return on assets)	Lag ROA	Lagged value of (1+Profit before tax/Total assets)	+
Banking sector size	SIZE	Annual percentage change in total bank assets (%)	+
Control Variables			
Inflation	INF	Annual percentage change in CPI (%)	-
Government consumption	EXP	Annual percentage change in government consumption (%)	+/-
Openness to economy	TRADE	Annual percentage change in Sum of exports and imports (%)	+
Stock market capitalisation	MKTCAP	Annual percentage change in market capitalisation (%)	+

Notes: The "+" sign shows that we expect a positive relationship between dependent variable and independent variable. The "-" sign shows that we expect a negative relationship between dependent variable and independent variable. The "+/-" sign shows that there is a reason to believe that the relationship could go in either direction.

Determinants of the profitability of banks

This section lists all the dependent and independent variables that we have used to investigate the determinants of the profitability of banks.

We have focussed on ROA as our key measure of bank profitability. ROA reflects the efficiency of banks in terms of generating income from their assets. Given the importance of deposits for the banks, we have also used return on deposits (ROD) as a second measure of bank profitability to check whether it generates results that are consistent with ROA. ROD has been used as a performance measure in some studies such as Basheer (1999), Hossain and Hossain (2015), Azhar Rosly and Afandi Abu Bakar (2003). ROD reflects how banks use the deposit of customer to generate profits. There are potential problems with ROD associated with separating customers' deposits with other borrowing such as borrowing from other banks. In line with other studies, we have used only time deposits and term-deposits to calculate return on deposits. The independent variables are also selected from a wider number of variables available in the literature (see Section 3.5 in Chapter 3). The independent variables are classified into three categories: bank-specific, industry-specific and macroeconomic variables. Expected signs are determined on the basis of past empirical findings, or on the basis of intuition. It is important to note that we have introduced two explanatory variables not used in previous studies: cash reserve requirements[16] and financial inclusion.[17]

We have measured cash reserve requirements with yearly percentage of deposits maintained by banks. There are mixed views about cash reserve requirements. Glocker and Towbin (2012) believe that an increase in the reserve requirement reduces the loans granted by banks. Reduction in loans results in a decrease in interest income and decreases the overall profitability of the banks. Demirgüç-Kunt

[16] In order to prevent banks from adopting aggressive lending strategies, central banks in many countries have imposed a reserve requirement policy. Banks are required to maintain a minimum fraction of deposits as reserves. That portion of deposits cannot be lent out.

[17] Financial inclusion relates to the "proportion of individuals and firms that use financial services" (World Bank, 2014)

& Huizinga (1999) and Maudos & De Guevara (2004) link cash reserve requirements with opportunity costs. They suggest that there is an opportunity cost of holding reserves because the interest rate paid to banks on the reserves is less than the market interest rate. On the other hand, Olusanya, Oyebo, and Ohadebere (2012) argue that more stringent reserve requirements improve the quality of the credit portfolios of banks and reduce non-performing loans; therefore, they have a positive impact on their profitability. Given these mixed views, we were unable to predict the sign of the relationship between cash reserve requirements and bank profitability.

Regarding financial inclusion, World Bank (2015) and Global Partnership for Financial Inclusion (GPFI) latest 2016 report [18] on G20 financial inclusion indicators suggest that financial inclusion has three dimensions: (i) usage of financial services; (ii) access to financial services; and (iii) quality of products and service delivery. Some of the indicators under usage of financial services are percentage of adults having a bank account and percentage of adults having at least one loan outstanding. Some of the indicators under access to financial services are number of branches per 100,000 and number of ATMs per 100,000 adults. Some of the quality indicators are use of savings for emergency funding and percentage of SMEs required to provide collateral on their bank loans. Usage of financial services (percentage of adults having a bank account) is considered as a common measure of financial inclusion, however, we have measured financial inclusion with access dimension (number of branches per 100,000) due to unavailability of yearly data on percentage of adults with a bank account. This allows us to explore supply-side

[18]https://www.gpfi.org/sites/default/files/documents/G20%20Financial%20Inclusion%20Indicators%20%282016%20Update%29.pdf

perspective of financial inclusion such as the impact of more access to banking services on the profitability of banks. There are also mixed views on the impact that financial inclusion may have on the bank profitability. Financial inclusion provides banking services to individuals and small businesses that has potential poverty-alleviating impacts and it can potentially increase bank profitability. Financial inclusion allows banks to extend their services to large pool of customers which will increase their deposits and loans. Increase in deposits and loans has a potential to increase in the profitability of banks. Financial inclusion allows banks to achieve diversification and it helps banks to reduce risk (Boot and Schmeits, 2000). On the other hand, providing financial services to individuals and small businesses has a potential to increase transaction costs and other overhead costs. Further, loans to individuals and small businesses are risky and can increase non-performing loans of banks. (Burgess, Wong, & Pande, 2005). Given mixed views, we are unable to predict the sign of the relationship between financial inclusion and bank profitability.

Table 4.3 provides a summary of the notations, measurements and expected effects of the variables used in our analysis.

Table 4.3: Definition of variables, notation and expected effect

Variables	Notation	Measure	Expected Sign
Dependent Variables			
Return on assets	ROA	Profit before tax/Total Assets (%)	
Return on deposits	ROD	Profit before tax/Total Deposits (%)	
Independent Variables			
Bank-specific Determinants			
Non-performing loan ratio	NPLR	Non-performing Loans/Total Loans (%)	-
Capital adequacy ratio	CAR	Tier 1 Capital + Tier 2 Capital / Risk-Weighted Assets (%)	+/-
Total assets (size)	SIZE	Natural log total assets of bank	+
Loans to deposit ratio	LDR	Total Loans / Total Deposits (%)	+/-
Off-balance sheet activities	OFFBS	Off-balance sheets Assets & Debts/Total Assets (%)	+/-
Cost-to-income ratio	COST	Operating Cost / Total Income (%)	-
Industry-specific Determinants			
Bank ownership (dummy)	GOVT	1 for state-owned bank and zero otherwise	-
Cash reserve requirement	CRR	Yearly percentage of deposits maintained by banks (%)	+/-
Financial Inclusion	FININC	Number of branches/100,000 adults	+/-
Macroeconomic Determinants			
Inflation	INF	Yearly percentage change in CPI (%)	+
Interest rate	INT	Discount rate of last quarter of calendar year (%)	+
Gross domestic product	GDP	Yearly GDP growth rate (%)	+

Notes: "+" sign shows that we expect a positive relationship between dependent variable and independent variable. "-" sign shows that we expect a negative relationship between dependent variable and independent variable. "+/-" sign shows that there is reason to believe that the relationship could go in either direction.

4.5 Conclusion

Five of the chapters in this thesis are empirical in nature. Different methods are used to address the research questions.

In order to investigate the relationship between the profitability of banks and economic growth, the OLS model is used with random effects. We have also investigated the causal relationship between the profitability of banks and economic growth through Granger causality. In addition, in order to identify how the impacts of profitability vary across different types of economies, we have used Wald tests.

In the chapters related to the determinants of the profitability of banks, we have mainly used random-effect models to address the research questions. In order to identify the differences in the determinants of profitability across various subsamples, we have used Wald tests with different settings.

Chapter 5: Do Profitable Banks Make a Positive Contribution to the Economy? A Study across Ten Asia-Pacific Countries

This chapter focuses on the relationship between the profitability of banks and economic growth in ten countries across the Asia-Pacific region in the period from 2004 to 2014.

5.1 Introduction

Many studies have highlighted the importance of the banking sector to economic development. Levine and Zervos (1998) suggest that banks foster economic growth by funding productive projects and that a successful banking sector is a prerequisite for economic growth. Athanasoglou et al. (2008) suggest that a profitable banking sector is necessary in order to harness the finance needed to support economic growth. Bank profitability is also important for a country's financial stability (Klein & Weill, 2017) and an increase in bank profitability reduces the likelihood of bank failures (Claeys & Schoors, 2007).

Given the importance of banking sectors to national economies, it is not surprising that they have been the subject of much academic interest, with there still being much disagreement as to the extent of the contribution that they make to economic growth. Previous studies have concentrated largely on measures of bank size when trying to explain the contributions of the banking sector to economic growth. However, Athanasoglou et al. (2008) argue that the profitability of banks is more important than their size in explaining their contributions. A related study by Cole et al. (2008) find that there is a positive relationship between the stock returns of banks and economic growth. This motivated a comprehensive study to identify the extent to which bank profits affect economic growth. Our study differs from Cole

et al. (2008) in that we use return on bank assets (ROA) as an explanatory variable to investigate the dynamic relationship between bank profitability and economic growth across ten economies in the Asia-Pacific region[19] for the period from 2004 to 2014. In addition to investigating the relationship between bank profitability and economic growth, we also examine how the impact of bank profitability on economic growth varies across different types of economies. The countries in our sample are at different stages of their economic growth. They include: small emerging, large emerging and developed economies.

Our results suggest that it is the profitability of banks that drives economic growth. We find strong evidence to suggest that there is a positive and statistically significant relationship between bank profitability in the period (t-1) and GDP growth in period (t). We also find that an increase in profitability leads to an increase in economic growth, while an increase in banking sector size leads to a decrease in economic growth. This indicates that for economic growth, the profitability of the banking sector is more important than growth in banking sector size. In addition, we find evidence of a positive and statistically significant relationship between GDP growth in the period (t-1) and GDP growth in period (t). Furthermore, our results suggest that the impact of bank profitability on economic growth decreases when the size of the banking sector increases. Finally, our findings confirm that inflation has a negative impact on economic growth, but government expenditure (education, health and infrastructure) has a positive impact on economic growth.

[19] The countries are Australia, Bangladesh, China, Hong Kong, India, Indonesia, Japan, Malaysia, Pakistan and Singapore.

5.2 Literature Review

A number of studies have investigated the impact of the development of the financial sector on economic growth. The most common used proxy for financial sector development has been the size of the banking sector. In the literature, private sector credit, total assets, loans, deposits and money supply are used as proxies for the size of the banking sector. This section reviews literature that mainly focuses on the ten countries in our study.

Aurangzeb (2012) investigated the relationship between banking sector development and economic growth in Pakistan. He used total loans, deposits and investments as measures of banking sector development. The results suggest a positive relationship between banking sector development and economic growth. Zhang, Wang, and Wang (2012) investigate the effect of financial sector development on economic growth in China. They use bank credit (loans) to measure financial sector development. Their findings also suggest that financial sector development promotes economic growth in China. Chen et al. (2013) also investigate the relationship between financial development and economic growth in China. They use bank loans, bank deposits and investments as proxies for financial sector development. They report a positive relationship between financial sector development and growth in high income provinces, and a negative relationship in low income provinces. Liu and Hsu (2006) investigate the role of the financial sector in economic growth in Taiwan, Korea and Japan. They use a composite measure of financial sector development which comprised three variables: money supply, private sector credit and Commercial–Central Bank[20]. Their results suggest that financial sector development hampers economic growth

[20]It is the ratio of domestic assets of banks to aggregate assets the central bank and all other banks.

in Japan and promotes economic growth in Taiwan. The impact of financial sector development was insignificant in Korea. Ahmed and Ansari (1998) investigate the relationship between financial sector development and economic growth in three South Asian countries: Pakistan, India and Sri Lanka. They use money supply and domestic credit as indicators of financial sector development and conclude that financial sector development promotes economic growth in South Asian countries.

Many studies have investigated the causal relationship between the financial sector development and economic growth. Choong, Yusop, Law, and Liew (2005) investigate the impact of financial sector development on economic growth in Malaysia. They use stock market liquidity and size as measures of financial sector development. Their results suggest that financial sector development promotes economic growth in Malaysia. In contrast, the results of Thangavelu and Jiunn (2004) suggest that it is economic growth that supports financial sector development in Australia. Hsueh, Hu, and Tu (2013) investigate the causal connections between the financial sector and economic growth in ten Asian countries. They use money supply and domestic assets of the financial sector as indicators of financial sector development. They conclude that there is a bidirectional relationship between financial sector development and economic growth in Malaysia, a unidirectional causal relationship from financial sector development to economic growth in China, Indonesia and Singapore, but no causal relationship between financial sector development and economic growth in Japan.

In summary, there is a degree of disagreement in previous studies regarding the direction of the relationship between financial sector development and economic growth, but most studies find a positive relationship. Similarly, there is disagreement in the findings of previous studies as to the direction of the causal

relationship between financial sector development and economic growth. Our study is different from these studies because we introduce a new measure of banking sector development – that is, profitability (ROA), which we examine along with the common measure used in literature (i.e., size). We use the total assets of banks to measure the size of the banking sector.

5.3 Data and Methods

This study utilises annual time series data from ten countries in the Asia-Pacific region for the period from 2004 to 2014.[21]

In order to investigate the relationship between bank profitability and economic growth, we use the following equation[22]:

$$GDP_{it} = \alpha + \beta_1 GDP_{i(t-1)} + \beta_2(1+ROA)_{it} + \beta_3(1+ROA)_{i(t-1)} + \beta_4 SIZE_{it} + \beta_7 INF_{it} + \beta_8 MKTCAP_{it} + \beta_9 EXP_{it} + \beta_{10} TRADE_{it} + GFCDummy + SmallemergingDummy + developedDummy + \in_{it} \quad (5.1)$$

In order to investigate a possible nonlinear relationship between bank profitability and economic growth, we use following equation[23]:

$$GDP_{it} = \alpha + \beta_1 GDP_{i(t-1)} + \sum_j^J \beta_1 X_{it}^j + \sum_{j=1}^J \beta_2 D_1 X_{it}^J + \sum_{l=1}^L \beta_l X_{it}^l + \in_{it} \quad (5.2)$$

where X_{it}^j refers to bank key explanatory variables, and X_{it}^l refers to variables related to macroeconomic and stock market capitalisation. $D_1.X_{it}$ is the difference between the coefficient values for small banking sectors and large banking sectors. The sum of X_{it} and $D_1.X_{it}$ is the coefficient for the explanatory variables for large banking sectors.

[21] Please refer to Section 4.2 in Chapter 4 for data sources and data treatment techniques.
[22] Please refer to Section 4.3.1 in Chapter 4 for more explanation on method.
[23] Please refer to Section 4.3.2 in Chapter 4 for more explanation on method.

In order to investigate how the effects of the key explanatory variables on economic growth vary across the three types of economies, we use the following equation[24]:

$$GDP_{it} = \alpha + \beta_1 GDP_{i(t-1)} + \sum_j^J \beta_1 X_{it}^j + \sum_{j=1}^J \beta_2 \mathrm{D}_1 X_{it}^J + \sum_{j=1}^J \beta_3 \mathrm{D}_2 X_{it}^J + \sum_{l=1}^L \beta_l X_{it}^l + \in_{it} \quad (5.3)$$

where X_{it}^j refers to bank key explanatory variables, and X_{it}^l refers to variables related to macroeconomic and stock market capitalisation. $D_1.X_{it}$ is the difference between the coefficient values for developed and small emerging economies and $D_2.X_{it}$ is the difference between the coefficient values for developed and large emerging economies. The sum of X_{it} and $D_1.X_{it}$ is the coefficient of the explanatory variables for small emerging economies and the sum of X_{it} and $D_2.X_{it}$ is the coefficient for the explanatory variables for large emerging economies.

In order to examine the causal relationship between bank profitability and economic growth, we have used following equations[25]:

$$GDP_{it} = \alpha + \beta_1 (1 + ROA)_{i(t-K)} + \beta_2 GDP_{i(t-K)} + \in_{it} \quad (5.4)$$

$$(1 + ROA)_{it} = \alpha + \beta_2 (1 + ROA)_{i(t-K)} + \beta_4 GDP_{i(t-K)} + \in_{it} \quad (5.5)$$

There is a potential issue of endogeneity from reverse causation. The lagged values of explanatory variables are used to determine the delayed impact and reduce the concerns associated with endogeneity.

Table 5.1 provides a summary of the dependent and independent variables. It includes notations, measurements and expected effects.[26]

[24] Please refer to Section 4.3.3 in Chapter 4 for more explanation on method.
[25] Please refer to Section 4.3.4 in Chapter 4 for more explanation on method.
[26] Please refer to Section 4.4 in Chapter 4 for more explanation on variables.

Table 5.1: Definition, notation and expected effect of the variables

Variables	Notation	Measure	Expected Sign
Dependent Variable			
Gross domestic product	GDP	Annual GDP growth rate (%)	
Independent Variables			
Key Variables			
Lagged gross domestic product	Lag GDP	Lagged value of annual GDP growth rate (%)	+
Return on assets	ROA	(1+Profit before tax/Total assets)	+
Lagged (1+ return on assets)	Lag ROA	Lagged value of (1+Profit before tax/Total assets)	+
Banking sector size	SIZE	Annual percentage change in total bank assets (%)	+
Control Variables			
Inflation	INF	Annual percentage change in CPI (%)	-
Government consumption	EXP	Annual percentage change in government consumption (%)	+/-
Openness to economy	TRADE	Annual percentage change in Sum of exports and imports (%)	+
Stock market capitalisation	MKTCAP	Annual percentage change in market capitalisation (%)	+

Notes: The "+" sign shows that we expect a positive relationship between dependent variable and independent variable. The "-" sign shows that we expect a negative relationship between dependent variable and independent variable. The "+/-" sign shows that there is a reason to believe that the relationship could go in either direction.

Table 5.2 reports summary statistics of the variables that are used in regressions. The results show that in the period 2004–2014, the average GDP growth across the countries in our study was 5.25%, which is higher than that in most other regions/countries such as the European Union (1.12%), OECD members (1.55%) and the United States (1.72%) over the same period. The actual growth rates ranged from –1.51% to +12.69%. The lowest growth was associated with Japan in 2009 while the highest GDP growth was associated with Singapore in 2010. The mean values of profitability measured with (1+ ROA) and lagged (1+ ROA) were 1.11 and 1.12, respectively. We use percentage change in banking sector size as another proxy for financial sector development. The mean values show that on average the banking sector grew by 5.3% during the sample period. However, the values ranged from –15.82% to +22.16% with a standard deviation of 10.1%.

Turning to macroeconomic variables, the mean value of INF was 4.72% which is higher than many other regions/countries such as the European Union (2.22%), OECD members (2.19%) and the United States (2.33%). This indicates that

inflation rose significantly in some of the countries in the sample during the period of study. The values ranged from –0.7% to +13.65%. Japan witnessed a negative inflation rate (–0.7%) in 2010 while Pakistan witnessed the highest inflation rate in 2008. The percentage change in government expenditure EXP shows that the average growth in government expenditure was 10.51% in the sampled countries. This is higher than the European Union (3.6%), OECD members (3.7%) and the United States (3.2%). The mean value of the percentage change in TRADE is –1.98% which indicates that the value of trade declined over the period of the study. However, trade also declined in the European Union (–.48%), OECD members (–4.8%) and the United States (–4.6%) during the same period. We also use percentage change in stock market capitalisation as an explanatory variable. The results show that average growth in market capitalisation was 8.93% over the period 2004–2014. The growth in stock market capitalisation was more than in the European Union (6.6%), OECD members (–0.3%) and the United States (–2%) during the same period.

Table 5.2: Descriptive statistics of variables over the period 2004–2014

Variable	Obs	Mean	Std. Dev.	Min	Max
GDP	100	5.25	3.141	-1.51	12.69
Lag GDP	90	5.2	3.20	-1.51	12.69
(1 + ROA)	100	1.10	0.37	0.31	1.83
Lag (1 + ROA)	90	1.12	0.38	0.31	1.83
SIZE (Change in total assets)	100	5.30	10.99	-15.82	22.16
INF	100	4.72	3.68	-0.7	13.65
EXP	100	10.51	9.18	-7.77	31.43
TRADE	100	-1.97	11.31	-37.48	16.47
MKTCAP	100	8.93	40.47	-64	110.01

Notes: These variables are selected from a number of available variables. We measured correlations between explanatory variables which indicated that multicollinearity is not a problem.[27]

[27] Please refer to Appendix 2 (Table A-11).

5.4 Empirical Results

5.4.1 Regression Results and Discussion

Table 5.3 reports regression results for the combination of all countries. For Columns 1 to 5, the results are obtained through a regression as set out in Equation 5.1. For Column 6, results are obtained through a regression as set out in Equation 5.2. In Columns 1 to 3, we show results for regressions that include all of the key variables and dummies but which differ with respect to the specification of the profitability variable. In Column 4, we introduce the macroeconomic and stock market variables, while in Columns 5 and 6 we introduce cross-product terms for bank profitability and size.

The coefficient of the lagged value of GDP growth is positive and statistically significant in all the models. These findings are as expected and are consistent with the results of Cole et al. (2008).

In Model 1, the coefficient of profitability is positive and statistically significant, suggesting a contemporaneous relationship between bank profitability and GDP growth. In Model 2, we substitute a lagged value of profitability and now find a positive and significant relationship between the lagged value of profitability and GDP growth. However, when both contemporaneous and lagged profitability measures are used simultaneously in the regression in Model 3, we find that only the lagged value of profitability remains significant. Hence, when we introduce the macroeconomic and market variables in Model 4, we only include the lagged profitability variable whose sign remains positive and highly significant. Our results confirm that the positive impact that bank profitability has on economic growth is slow in its transition. These findings provide support for the proposition made by Athanasoglou et al. (2008) that a well-functioning and profitable banking sector is

necessary to drive economic growth. In terms of economic significance, the results show that 1% increase in profitability in the period (t-1) leads to an increase in GDP growth in the period (t) by 0.42%. We also find evidence of a positive and statistically significant relationship between GDP growth in the period (t-1) and GDP growth in period (t). In terms of economic significance, the results show that 1% increase in GDP in the period (t-1) leads to an increase in GDP growth in the period (t) by 0. 24%.

Somewhat unexpectedly, the coefficient for our size variable is negative and weakly significant in our first four models. Some other studies have also found that bank size is negatively correlated to economic growth. For example, Wang et al. (2015) find a negative impact of bank size on the economic growth in China. They suggest that the loans extended by banks were not utilised for productive investments which resulted in an increase in non-performing loans and a decline in economic growth. Similarly, Chen at el. (2013) also find a negative relationship between bank size and economic growth. They also argue that were loans extended to inefficient sectors, therefore, the impact of bank size on economic growth was negative. Some other studies that have found a negative impact of bank size on economic growth are the studies by La Porta et al. (2002) and Prochniak and Wasiak (2017). We next decided to introduce a cross-product term (Lag (1+ROA)*SIZE)) with profitability and size in order to examine the joint impact that these variables have on economic growth (Model 5). We find that this cross-product term has a negative sign and is significant, indicating the positive impact that lagged profitability has on economic growth is weaker for the faster-growing banks, as shown below.

$$\frac{\Delta GDP}{Lagged\ (1+ROA)} = 8.816 - 0.479(5.3) = \ 6.277$$

The coefficient for lagged (1+ROA) is 8.816 while the coefficient for the cross-product term is –0.479. The average growth in bank size is 5.3%. The result shows that increased bank profitability increases GDP growth.

$$\frac{\Delta GDP}{SIZE} = -0.0216 - 0.479(1.122) = \ -0.559$$

The coefficient for bank size is –0.0216 while the coefficient for the cross-product term is –0.479. The average profitability is 1.122. The result shows that increased bank size reduces bank profitability.

In Model 6, we divide the ten banking sectors into large banking sectors and small banking sectors based on their bank assets to population ratio.[28] In both the large and small banking sectors, we find a positive relationship between the lagged value of profitability and GDP growth. However, the coefficients for small banking sectors (9.78) and for large banking sectors (4.4) show that the impact that bank profitability has on economic growth is much larger in those countries with smaller banking sectors. We also introduced a cross-product term (Lag (1+ROA)*SIZE)) for both small and large banking sectors to examine the joint impact that these variables have on economic growth. The coefficient of the cross-product term for both large and small banking sectors is negative and significant: –0.092 for large banking sectors and –0.581 for small banking sectors. This shows that in both cases the cross-product term has a negative impact on economic growth with this negative impact being much larger for the smaller banking sectors, as shown below.

[28] Please refer to Section 4.3.2 in Chapter 4 for more explanation.

Small banking sectors:

$$\frac{\Delta GDP}{Lagged\ (1+ROA)} = 9.78 - 0.581(3.8) = \ 7.57$$

The coefficient for lagged (1+ROA) is 9.78 while the coefficient for the cross-product term is –0.581. The average growth in bank size of small banking sectors is 3.8%. The result (7.57) shows that increased bank profitability increases GDP growth.

$$\frac{\Delta GDP}{SIZE} = -0.0277 - 0.581(1.2) = \ -0.725$$

The coefficient for bank size is –0.0277 while the coefficient for the cross-product term is –0.581. The average profitability of small banking sectors is 1.2. The result shows that increased bank size reduces bank profitability.

Large banking sectors:

$$\frac{\Delta GDP}{Lagged\ (1 + ROA)} = 4.379 - 0.092(7.56) = \ 3.623$$

The coefficient for lagged (1+ROA) is 4.379 while the coefficient for the cross-product term is –0.092. The average growth in bank size of large banking sectors is 7.56%. The result (3.623) shows that increased bank profitability increases GDP growth.

$$\frac{\Delta GDP}{SIZE} = -0.0277 - 0.092(0.95) = \ -0.115$$

The coefficient for bank size is –0.0277 while the coefficient for the cross-product term is –0.092. The average profitability of large banking sectors is 0.95. The result shows that increased bank size reduces bank profitability.

The overall results for small banking sectors and large banking sectors clearly shows that the positive impact of banking profitability on GDP growth and negative impact of bank size is much larger in case of small banking sectors.

We use a dummy variable for GFC which is designated as applying in 2008 and 2009. The coefficient is negative and statistically significant, which is consistent with economic growth decreasing during the Global Financial Crisis. Further, the negative and significant coefficients of dummy variables for small emerging economies and developed economies suggest that the GDP growth rate in these economies was slower than in the large emerging economies (China and India) during the sample period.

In terms of macroeconomic variables, the coefficient for inflation is negative and statistically significant. It is not surprising because many studies suggest that inflation reduces the level of investments and hinders economic activities. The finding is consistent with our expectations and the findings in previous studies (Koivu, 2002; Ndlovu 2013). We also find that an increase in government expenditure leads to an increase in economic growth. Again, it is not surprising to find that government expenditure that includes expenditure on education, health and infrastructure, has a positive impact on economic growth. This finding is consistent with Wijnbergen (1983) who also finds that government expenditure leads to an increase in economic growth. We further find that growth in stock market capitalisation leads to an increase in the rate of economic growth which is consistent with the findings of Goldsmith (1969). We find trade to be the only macroeconomic variable that we included that does not impact on economic growth.

Table 5.3: Regression results

Dependent variable: GDP Growth (%)	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Explanatory Variables						
Key variables						
Lag GDP	0.300***	0.276***	0.276***	0.242***	0.187**	0.192**
	(3.15)	(2.93)	(2.91)	(2.76)	(2.07)	(2.30)
(1 + ROA)	1.947***		-0.0542			
	(2.80)		(-0.04)			
Lag (1 + ROA)		2.302***	2.346*	1.957***	8.816***	
		(3.43)	(1.89)	(3.08)	(2.69)	
Lag (1 + ROA) - small banking sectors						9.780***
Lag (1 + ROA) - large banking sectors						4.397***
SIZE (Change in total assets)	-0.0336*	-0.0331*	-0.0330	-0.0122*	-0.0216	-0.0277
	(-1.65)	(-1.65)	(-1.64)	(-1.86)	(-1.09)	(-1.51)
Lag (1+ROA)*SIZE					-0.479**	
					(-2.08)	
Lag (1+ROA)*SIZE - Small banking sectors						-0.581**
Lag (1+ROA)*SIZ - Large banking sectors						-0.092**
Dummies						
During GFC	-2.080***	-2.263***	-2.267***	-2.254***	-2.353***	-2.377***
	(-3.80)	(-4.23)	(-4.14)	(-4.46)	(-4.66)	(-5.17)
Small emerging economies	-2.024***	-2.114***	-2.116***	-1.968***	-3.876***	-4.618***
	(-2.85)	(-3.04)	(-3.02)	(-3.05)	(-3.40)	(-4.18)
Developed Economies	-2.497***	-2.563***	-2.567***	-2.468***	-3.994***	-5.651***
	(-3.06)	(-3.23)	(-3.19)	(-3.14)	(-3.67)	(-4.33)
Macroeconomic and stock market variables						
INF				-0.0988	-0.235**	-0.212**
				(-1.37)	(-2.43)	(-2.33)
EXP				0.0923***	0.0866***	0.0830***
				(3.88)	(3.50)	(3.68)
TRADE				-0.00276	-0.00384	-0.00680
				(-0.14)	(-0.19)	(-0.37)
MKTCAP				0.0110**	0.00759	0.00867*
				(2.16)	(1.39)	(1.74)
Constant	3.883***	3.681***	3.693***	3.438***	5.451***	6.096***
	(3.30)	(3.28)	(3.17)	(3.11)	(3.62)	(4.32)
Number of countries	10	10	10	10	10	10
Number of banks	649	649	649	649	649	649
Number of observations	90	90	90	90	90	90
Adjusted R-squared	56.73%	58.54%	58.54%	67.80	68.77	70.10

Notes: The table reports the results for the regression Equation 5.1. Our dependent variable is economic growth. *t*-Values are in parenthesis. * Significant at 10% level, **Significant at 5% level, ***Significant at 1% level.

5.4.2 Effect of Variables across Small Developed, Small Emerging and Large Emerging Economies

Table 5.4 reports how the impact of the lagged value of the profitability measure (1+ROA) and an interaction variable (lagged value of ROA*SIZE) differs across developed, small emerging and large emerging economies. The results are obtained through a regression as set out in Equation 5.3. X_{it} is the coefficient of the explanatory variables for developed economies, $D_1.X_{it}$ is the difference between the coefficient values for developed and small emerging economies and $D_2.X_{it}$ is the difference between the coefficient values for developed and large emerging economies. The sum of X_{it} and $D_1.X_{it}$ is the coefficient for the explanatory variables for small emerging economies and the sum of X_{it} and $D_2.X_{it}$ is the coefficient for the explanatory variables for large emerging economies.

Our results highlight that there is some variation between the impact of the lagged value of profitability measure (1+ROA) and the impact of an interaction variable (lagged value of ROA*SIZE) on economic growth across the economies at different stages of development.

Lagged profitability has a positive and significant impact on economic growth in all three types of economies. However, the coefficient shows that the impact is larger for developed economies than for small emerging or large emerging economies. These results are consistent with our pooled regression results in Table 5.3.

The coefficients for the interaction variables (lagged value of ROA*SIZE) for small emerging economies and large emerging economies are –0.566 and –0.493, respectively. In both cases the relationship is significant. This indicates that the impact that lagged profitability has on economic growth is weaker for faster-

growing banks in small emerging and large emerging economies. In the case of the developed economies, the coefficient is also negative but statistically insignificant. Overall, the results suggest that an increase in profitability leads to an increase in economic growth, while an increase in banking sector size leads to a decrease in economic growth in small emerging and large emerging economies.

Table 5.4: Effect of lagged profitability and interaction term (lagged profitability*bank size) on economic growth across economies.

Subsamples	Lag (1 + ROA)	Lag (1 + ROA)*SIZE
Developed (b0.Xit)	9.626***	-0.257
b1.D1.Xit	-3.710***	-0.309***
b2.D2.Xit	-4.720	-0.236
Small Emerging (b0+b1)	5.916***	-0.566***
Large Emerging (b0+b2)	4.906***	-0.493**

Notes: The table reports the results for the regression Equation 5.2. Our dependent variable is economic growth. * Significant at 10% level, **Significant at 5% level, and ***Significant at 1% level. X_{it} is the coefficient for the explanatory variables for developed economies, $D_1.X_{it}$ is the difference between the coefficient values for developed and small emerging economies and $D_2.X_{it}$ is the difference between the coefficient values for developed and large emerging economies. $D_1 = 1$ if small emerging, 0 otherwise and $D_2 = 1$ if large emerging and 0 otherwise. The sum of X_{it} and $D_1.X_{it}$ is the coefficient for the explanatory variables for small emerging economies and the sum of X_{it} and $D_2.X_{it}$ is the coefficient for the explanatory variables for large emerging economies.

5.4.3 Bank Profitability and Economic Growth – a Causality Analysis

We also investigate the causal relationship between bank profitability and economic growth to determine the direction of relationship. Table 5.5 reports the results of the Granger causality tests. The results were obtained through a regression as set out in Equations 5.4 and 5.5. The null hypotheses are: i) Bank profitability (1+ROA) does not cause GDP growth and ii) GDP growth does not cause bank profitability (1+ROA). We use the lag order of 1 and the lag of order 2 to determine the causal relationships.

The results suggest that unidirectional causality runs from bank profitability (1+ROA) to GDP growth at lag order one, while at lag order two a bi-directional causal relationship exists between bank profitability and economic growth. This

indicates that the impact of bank profitability is more immediate, while GDP growth has a delayed feedback on bank profitability.

Table 5.5: Granger Causality results

Null Hypothesis	**Lag Order: 1** p-value	**Lag Order: 2** p-value
H_0: Bank profitability does not cause GDP Growth.	0.000***	0.000***
H_0: GDP Growth does not cause Bank profitability.	0.702	0.000***

Notes: The table reports the results for the Equations 5.4 and 5.5. * Significant at 10% level, **Significant at 5% level, and ***Significant at 1% level.

5.5 Conclusion

This study investigates the relationship between the profitability of banks and economic growth in ten countries across Asia-Pacific region in the period from 2004 to 2014.

We start with the proposition that a national economy cannot run smoothly without a well-functioning and profitable banking sector. Our results show that there is a positive and statistically significant relationship between the profitability of banks and economic growth. However, the impact that bank profitability has on economic growth is slow to take effect. Our findings suggest that economic growth in period (t) is largely dependent upon banking sector profitability in the period (t-1). In relation to bank size, our findings are interesting. Our results show that increases in bank size have a negative impact on economic growth, which not consistent with our expectations. Overall, our results suggest that an increase in the profitability of the banking sector leads to an increase in economic growth, while an increase in the size of the banking sector leads to a decrease in economic growth. The causality results suggest that bank profitability fosters economic growth, and that GDP growth has a delayed feedback on bank profitability. Furthermore, our results

suggest that the impact of bank profitability on economic growth decreases when the size of the banking sector increases.

In line with our expectations, we find that economic growth was hampered during the Global Financial Crisis. Our results suggest that economic growth is faster in large emerging markets (India and China) than in small emerging economies (Bangladesh, Indonesia, Malaysia and Pakistan) or developed economies (Australia, Hong Kong, Japan and Singapore).

Our results indicate that inflation has a negative effect on economic growth, and that increases in government expenditure on health, education and infrastructure lead to an increase in economic growth.

One other question of interest is: Do the explanatory variables impact differently on different types of economies? Our results show that the impact of lagged value on profitability is larger for developed economies than it is for small emerging and large emerging economies. In addition, our results for the interaction term (lagged value of ROA*SIZE) suggest that an increase in profitability leads to an increase in economic growth, while an increase in banking sector size leads to a decrease in economic growth in small emerging and large emerging economies. In the case of developed economies, the coefficient is also negative but statistically insignificant.

Overall, our results support the view of Athanasoglou et al. (2008) that bank profitability is a prerequisite for economic growth. Policy makers should be aware of the impact that policies and regulations will have on bank profitability because of the possible knock-on impact it might have on the economy.

Chapter 6: Factors Influencing the Profitability of Banks in Ten Countries in the Asia-Pacific Region

This chapter investigates the effect of bank-specific, industry-specific and macroeconomic variables on the profitability of commercial banks in ten countries in the Asia-Pacific region in the period 2004–2014.

6.1 Introduction

In Chapter 5, we find that the profitability of banks has a positive impact on the economic growth in the Asia-Pacific region. Therefore, it is important to investigate the determinants of the profitability of banks. In this chapter, we investigate the determinants of the profitability of banks across our ten Asia-Pacific countries for the period 2004–2014. We place these countries in three categories based on the state of their economies: small emerging economies, large emerging economies and developed economies. The small emerging economies in this study are Bangladesh, Indonesia, Malaysia and Pakistan; the large emerging economies are China and India; and the developed economies are Australia, Hong Kong, Japan and Singapore. The banks in these countries maintain minimum capital adequacy ratios according to the Basel Accords. Banks in most of these countries are also required to maintain a certain portion of their deposits as cash reserves that cannot be lent out. In addition to investigating of the determinants of the profitability of banks, this chapter identifies how the impacts of the determinants of profitability vary across small emerging, large emerging and developed economies and how they varied in the Global Financial Crisis (GFC) and non-GFC periods.

Our results suggest that banks with high non-performing loans, high loan to deposit ratios and high cost to income ratios are less profitable. On the other hand, banks that maintain high capital ratios are more profitable than their competitors. Our

results indicate that small banks are more profitable than large banks. Of the industry-specific variables, we find that increases in cash reserve requirements lead to increases in bank profitability, and that increases in financial inclusion lead to decreases in bank profitability. Of the macroeconomic variables, only one variable (interest rate) is significant, which suggests that banks perform better when interest rates are high. Furthermore, when we split the sample into three sub-samples (small emerging, large emerging and developed economies), we find a positive impact of the loan to deposit ratios on the profitability of banks in developed and small emerging economies, but a negative impact on bank profitability in large emerging economies.

6.2 Data and Method

Our sample period runs from 2004 to 2014 and we can see from Table 6.1 that our dataset comprises 5,225 bank-year observations from 649 banks in ten countries in the Asia-Pacific region.[29]

Table 6.1: Number of banks and observations by country

Country	Number of banks	Observations
Pakistan	28	281
Bangladesh	47	394
Malaysia	50	440
Indonesia	80	666
India	58	577
China	159	1,090
Australia	33	224
Hong Kong	35	298
Japan	138	1,132
Singapore	21	123
Total	**649**	**5,225**

[29] Please refer to Section 4.2 in Chapter 4 for sources of data and data treatment techniques.

We investigate the impact of bank-specific, industry-specific and macroeconomic variables on the profitability of banks using ordinary least squares (OLS) incorporating random effects. The functional form of the model is given below[30].

$$\pi_{it} = \alpha + \sum_{j=1}^{J} \beta_j X_{it}^{j} + \sum_{l=1}^{L} \beta_l X_{it}^{l} + \sum_{m=1}^{M} \beta_m X_{it}^{m} + \sum_{n=1}^{N} \beta_n X_{i}^{n} + \sum_{p=1}^{P} \beta_p X_{i}^{p} + \in_{it} \quad (6.1)$$

where π_{it} is a measure of the profitability of bank i at time t with i=1, … N and t=1, … T, α is a constant term, X_{it}^{j} indicates bank-specific explanatory variables, X_{it}^{l} refers to industry-specific variables, X_{it}^{m} indicates macroeconomic variables X_{i}^{n} is a dummy variable for GFC and X_{i}^{p} is a dummy variable for type of economy.

In all the cases, we will run regressions on bank-specific variables first; next we will add industry-specific variables; and finally we will add macroeconomic variables to identify the differences across the estimated results and to determine the extent to which the explanatory power of the model increases with the addition of industry-specific and macroeconomic variables.

In order to examine how the impact of determinants on bank profitability differs across three types of economies and during GFC and non-GFC periods, we use the following equation[31]:

$$\pi_{it} = \alpha + \sum_{j}^{J} \beta_1 X_{it}^{j} + \sum_{j=1}^{J} \beta_2 \mathrm{D}_1 X_{it}^{J} + \sum_{j=1}^{J} \beta_3 \mathrm{D}_2 X_{it}^{J} + \sum_{l=1}^{L} \beta_l X_{it}^{l} + \sum_{m=1}^{M} \beta_m X_{it}^{m} + \in_{it} \quad (6.2)$$

where X_{it}^{j} refers to bank-specific explanatory variables, X_{it}^{l} refers to industry-specific variables and X_{it}^{m} indicates macroeconomic variables.

[30] Please refer to Section 4.3.3 in Chapter 4 for more explanation on method.
[31] Please refer to Section 4.3.4 in Chapter 4 for more explanation on method.

6.3 Dependent and Explanatory Variables

Table 6.2 provides a summary of the dependent and independent variables. It includes notations, measurements and expected effects.[32] We use return on assets as a key measure of bank profitability. This is the most widely used measure in the literature. We also use return on deposits as a dependent variable in order to determine the robustness of the results. The expected effects are based on the findings in the literature and on intuition.

Table 6.2: Definition of variables, notation and expected effect

Variables	Notation	Measure	Expected Sign
Dependent Variable			
Return on assets	ROA	Profit before tax/Total Assets (%)	
Return on deposits	ROD	Profit before tax/Total Deposits (%)	
Independent Variables			
Bank-specific Determinants			
Non-performing loan ratio	NPLR	Non-performing Loans/Total Loans (%)	-
Capital adequacy ratio	CAR	Tier 1 Capital + Tier 2 Capital / Risk-Weighted Assets (%)	+/-
Total assets (bank size)	SIZE	Natural log of total assets of bank	+
Loans to deposit ratio	LDR	Total Loans / Total Deposits (%)	+/-
Off-balance sheet activities ratio	OFFBS	Off-balance sheets Items/Total Assets (%)	+/-
Cost to income ratio	COST	Operating Cost / Total Income (%)	-
Industry-specific Determinants			
Bank ownership (dummy)	GOVT	1 for state-owned bank and zero otherwise	-
Cash reserve requirement	CRR	Yearly percentage of deposits maintained by banks (%)	+/-
Financial inclusion	FININC	Number of branches/100,000 adults	+/-
Macroeconomic Determinants			
Inflation	INF	Yearly percentage change in CPI (%)	+
Interest rate	INT	Discount rate of last quarter of calendar year (%)	+
Gross domestic product	GDP	Yearly GDP growth rate (%)	+

Notes: "+" sign shows that we expect a positive relationship between dependent variable and independent variable. "-" sign shows that we expect a negative relationship between dependent variable and independent variable. "+/-" sign shows that we are uncertain about the relationship between dependent and independent variables.

Table 6.3 reports the descriptive statistics of the dependent and independent variables for banks. In this chapter, we concentrate only on the combined results

[32] Please refer to Section 2.4 in Chapter 2 and Section 4.4 in Chapter 4 for more explanation on variables.

for all countries. Descriptive statistics for individual countries or types of economies will be discussed in the next three chapters. We report the means, standard deviations, minimum values and maximum values for each variable.

The average return on assets and return on deposits for the entire sample are 1.21% and 1.56%, respectively. The values range from -1.4% to 4.2% for ROA and from -1.81% to 6.9% for ROD, indicating that there is a large difference in profitability across the banks in our sample.

For the bank-specific variables, our results show a large difference across the banks in the sample. The average non-performing loan ratio is 3.62% with a minimum value of 0.10% and a maximum value of 16.30%. This is not surprising as banks in emerging economies have higher non-performing loan ratios than banks in developed economies. Similarly, the average capital adequacy ratio is 16.19% with a minimum value of 7.34% and maximum value of 54.40%. The difference is mainly due to the different requirements associated with maintaining capital ratios in different countries. In addition to these variables, we find large differences for bank size (log), loan to deposit ratio, off-balance sheet ratio and cost to income ratio.

In terms of the industry-specific variable, the results show that 11% of the banks in our sample were government owned and 89% were privately owned. The average cash reserve requirement ratio is 6% with a minimum value of zero and maximum value of 19.25%. The large variation is due to different cash reserve requirements in the countries in our sample. For example, banks in China are required to maintain 19% cash reserves while there are no requirements for maintaining cash reserves in Australia and Hong Kong. The average financial inclusion (number of bank branches/100,000 adults) is 16 in our sample. The values ranged from 5.80 to 34.37

– a large variation due to different levels of financial development across countries in the sample.

Turning to macroeconomic variables, the mean value of inflation is 4.08%. The values range from -0.72% to 12%. Japan witnessed a negative inflation rate (-0.72%) in 2010 while the highest inflation rate was associated with Pakistan in 2008. The mean interest rate is 5.66%. The values range from 0.5% to 12%. Given that our sample consists of different types of economies, this result is not surprising as the interest rates in emerging economies are higher than in developed economies. The average GDP growth is 5.42% with a minimum value of -1.5% and maximum value of 12.69%, reflecting that the countries are at different stages in their economic development.

Table 6.3: Descriptive statistics of variables over the period 2004–2014

Variable	Mean	Std. Dev.	Min	Max
Bank profitability				
Return on assets (%)	1.21	1.10	-1.40	4.20
Return on deposits (%)	1.56	1.60	-1.81	6.90
Bank-specific variables				
Non-performing loan ratio (%)	3.62	3.58	0.10	16.30
Capital adequacy ratio (%)	16.19	9.45	7.34	54.40
Total assets (bank size)	5.23	1.94	0.02	12.10
Loan to deposit ratio (%)	68.01	19.61	17.40	118.40
Off-bal. sheet activities (%)	16.04	13.62	0.12	45.50
Cost to income ratio (%)	53.69	18.63	22.35	102.40
Industry-specific variables				
State-owned banks	0.11	0.31	0.00	1.00
Cash reserve requirement (%)	6.03	5.72	0.00	19.25
Financial inclusion	15.99	10.99	5.80	34.37
Macroeconomic variables				
Inflation (%)	4.08	3.47	-0.72	11.99
Interest rate (%)	5.66	2.38	0.50	12.00
GDP growth (%)	5.42	3.40	-1.50	12.69
Dummies				
During GFC	0.18	0.38	0	1

Notes: These variables are selected from a number of available variables. We measured correlations between explanatory variables. The results suggest that collinearity is not a problem.[33]

[33] Please refer to Appendix 2 (Table A-12).

6.4 Empirical Results

6.4.1 Regression Results and Discussion

Table 6.4 shows the aggregate regression results obtained through the regression as set out in Equation 6.1. The results are based on the pooled data of the ten countries.

Panel A reports the results for the profitability measure return on assets (ROA) and Panel B reports the results for profitability measure return on deposits (ROD). Column 1 and Column 4 show the results for the bank-specific explanatory variables only, to which we next add the industry-specific variables (Column 2 and Column 5) and we then further add the macroeconomic variables (Column 3 and Column 6). Overall, the results show that the explanatory power of the model increases slightly when we add first the industry-specific variables and then the macroeconomic variables. In the case of ROA, the adjusted r-squared for the model with all variables included is 53.61%; and in the case of ROD, the adjusted r-squared for the model with all variables included is 51.22%.

Our findings suggest that five out of six bank-specific variables have a significant impact on the profitability of the banks. There is strong evidence that a bank's non-performing loan ratio (NPLR), its total assets (SIZE), and its cost to income ratio (COST) all have a negative relationship with its profitability.[34] The only one of these that is obviously at variance with expectations is SIZE, which one might expect to have a positive impact on profits. However, there are some studies that have also found a negative relationship between SIZE and bank profitability. Tan and Floros (2012b) and Tan (2016) both find a negative relationship between SIZE and bank profitability in China, the former putting it down to the fact that smaller

[34] In terms of economic significance, the results show that 1% increase in NPLR, SIZE and COST reduces bank profitability by 0.17%, 0.48% and 1.58%, respectively.

banks find it easier to deal with bureaucracy, while the latter suggests that management in smaller banks finds it easier to concentrate on its key profitable segments. Furthermore, findings of Liu and Wilson (2009) also suggest that small banks are more profitable than large banks in Japan. They argue that there ae less business opportunities for small banks, therefore, they provide loans to high risk borrowers. In order to compensate their risk, they charge high interest rates which increases their profitability. On the other hand, large banks are selective in terms of lending and charge lower rates to eliminate the rivals. Our results suggest that capital adequacy ratio (CAR) and loan to deposit ratio (LDR) have a positive and statistically significant correlation with the profitability of banks. In both cases, due to mixed findings in the literature, there was uncertainty as to the direction of their expected impact on profits. For CAR, these results are consistent with some previous studies. For example, Sufian and Habibullah (2009) and García-Herrero et al. (2009) suggest that well-capitalised banks are more profitable because banks with a strong capital structure are less likely to default and are more likely to attract low-cost funding. Furthermore, Berger (1995) argues that the banks with high capital require less debt finance which reduces their interest expense and increase their earnings. Lee and Hsieh (2013) also suggest high level of capital reduces risk and increase profitability. Regarding LDR, Tan and Floros (2012a) find a positive impact of LDR on bank profitability. Their findings suggest that the low liquidity of banks indicates that the banks have lent out larger amounts in loans, and that they have generated higher levels of profitability. One bank-specific variable that we find did not have a significant impact on the profitability is off-balance sheet activities.

Our findings suggest that the performances of banks were negatively affected by the Global Financial Crisis in 2008–2009. Furthermore, our results indicate that banks in small emerging economies (Bangladesh, Indonesia, Malaysia and Pakistan) are more profitable than banks in developed economies (Australia, Hong Kong, Japan and Singapore) and that banks in large emerging economies are less profitable than banks in developed economies.

In terms of industry-specific variables, contrary to our expectations we find weak evidence that state-owned banks are more profitable than privately owned banks. This is in contrast with our expectations. One possible explanation is state-owned banks in these countries are much larger than private banks and their large size allows them to benefit from economies of scale and increase the profitability. Further, our results suggest that cash reserve requirement (CRR) has a positive relationship with the profitability of banks. Given CRR has not been used in previous studies, there was uncertainty as to the direction of its expected impact on profits. CRR restricts the lending ability of banks and this enables banks to improve the quality of loans through lending only to selected customers (Olusanya, Oyebo, and Ohadebere, 2012). It appears that an improvement in credit quality leads to an increase in profitability. Financial inclusion (FININC) has also not been used in previous studies, so it was uncertain as to the effect that an increase in FININC would have on banking profits. We find strong evidence to suggest that the impact is negative. There are two possible explanations for this finding. First, extending financial services to individuals and small businesses has a potential to increase the transaction costs and other overhead costs. This proposition gains some support from a positive correlation between COST and FININC. Second, providing loans

to individuals and small businesses has a potential to increase default rates and non-performing loans and it can reduce bank profitability.

Of the macroeconomic variables, the only one that has a strong impact on both profitability measures is interest rate, which has an expected positive impact on the profitability of banks. It is in line with the previous studies. It appears that when central banks increase interest rates, banks in developing countries improve their spreads by increasing lending rates by more percentage points than they do deposit rates (Demirgüç-Kunt & Huizinga, 1999; Maudos & De Guevara, 2004). The effect of GDP growth on the ROA is insignificant but it has a negative impact on ROD. The results show that inflation does not have any impact on the profitability of banks.

Table 6.4: Regression results

Variables	Panel A			Panel B		
	(1)	(2)	(3)	(4)	(5)	(6)
Bank-specific variables						
Non-performing loan ratio	-0.0574***	-0.0555***	-0.0561***	-0.0681***	-0.0645***	-0.0645***
	(-18.14)	(-17.32)	(-17.28)	(-14.38)	(-13.49)	(-13.33)
Capital adequacy ratio	0.0100***	0.00924***	0.00948***	0.0284***	0.0271***	0.0273***
	(6.61)	(6.08)	(6.25)	(12.47)	(11.91)	(11.95)
Log (size)	-0.127***	-0.123***	-0.112***	-0.184***	-0.168***	-0.166***
	(-8.64)	(-7.77)	(-7.02)	(-8.33)	(-7.04)	(-6.85)
Loan to deposit ratio	0.00134**	0.00197***	0.00212***	0.00906***	0.0102***	0.0106***
	(1.98)	(2.88)	(3.09)	(8.95)	(9.92)	(10.27)
Off-balance sheet activities	0.000798	0.000284	0.000465	0.00163	0.000545	0.000663
	(0.81)	(0.28)	(0.46)	(1.11)	(0.36)	(0.44)
Cost to income ratio	-0.0360***	-0.0356***	-0.0355***	-0.0493***	-0.0487***	-0.0486***
	(-47.89)	(-47.30)	(-47.16)	(-43.85)	(-43.22)	(-43.15)
Dummies						
During GFC	-0.0698***	-0.0754***	-0.0777***	-0.0946***	-0.107***	-0.146***
	(-3.70)	(-3.98)	(-3.55)	(-3.36)	(-3.78)	(-4.48)
Small emerging economies	1.135***	1.233***	1.145***	1.552***	1.643***	1.502***
	(13.35)	(12.59)	(11.76)	(12.01)	(11.10)	(10.07)
Large emerging economies	-0.100	-0.722***	-0.726***	-0.278***	-1.412***	-1.346***
	(1.50)	(5.33)	(5.49)	(2.71)	(6.89)	(6.61)
Industry-specific variables						
State-owned banks		0.174*	0.139		0.229	0.186
		(1.80)	(1.51)		(1.56)	(1.30)
Cash reserve requirement		0.0121***	0.0103**		0.0158***	0.0113*
		(3.03)	(2.55)		(2.64)	(1.86)
Financial inclusion		-0.0219***	-0.0230***		-0.0443***	-0.0490***
		(-3.93)	(-4.16)		(-5.26)	(-5.77)
Macroeconomic variables						
Inflation			0.00393			0.00561
			(0.92)			(0.88)
Interest rate			0.0159***			0.0105
			(2.62)			(1.16)
GDP growth			-0.00568			-0.0221***
			(-1.20)			(-3.14)
Constant	3.318***	3.265***	3.174***	3.695***	3.698***	3.877***
	(31.44)	(26.84)	(21.22)	(23.26)	(20.25)	(17.21)
Number of observations	5,225	5,225	5,225	5,225	5,225	5,225
Adjusted R-squared	51.69%	52.06%	53.61%	49.66%	50.28%	51.22%

Notes: Our dependent variables are return on assets and return on deposits. Return on assets is defined as profit before tax as a percentage of total assets of the bank and return on deposits is defined as profit before tax as a percentage of total deposits of the bank. Column (1) and Column (4) show the estimated results for bank-specific variables, Column (2) and Column (5) show results for bank-specific and industry-specific variables and Column (3) and Column (6) show the results for bank-specific, industry-specific and macroeconomic variables. *t*-Values are in parentheses. * Significant at 10% level, **Significant at 5% level, ***Significant at 1% level.

We also report the results in Panel B of Table 6.5 where we use return on deposits (ROD) as the proxy for bank profitability. The results are largely consistent with those obtained when using ROA, with the exception of two of the macroeconomic variables. Interest rate is found to have a positive impact on ROA but it does not have a significant impact on ROD. There is no relationship between GDP growth and ROA but GDP growth has a negative impact on ROD. Given these inconsistent findings, we have restricted our subsequent analysis to only using ROA as the dependent variable.

6.4.2 Effect of Bank-Specific Variables across Two Subsamples (Table 6.5)

In this section, we analyse the data by splitting the sample in two different ways: firstly into small emerging, large emerging and developed economies, and secondly into banks during GFC period and during the non-GFC period. This analysis is conducted using the regression set out in Equation 6.2.

Small emerging, large emerging and developed economies

Our results suggest that four variables NPLR, CAR, SIZE and COST have the same impact on the profitability of banks across all types of economies, which is in line with our results for the pooled data. NPLR, SIZE and COST have a negative impact on bank profits in each of the three categories, whereas CAR has a positive impact on bank profitability in each of the three categories. It is important to note that the negative impact of NPLR on the profitability of banks in developed economies is much larger than it is small emerging and large emerging economies. For example: a 1% increase NPLR reduces the profitability of banks by 0.05% in small emerging economies and by 0.03% in large emerging economies, but the same increase in NPLR reduces the profitability of banks by 0.07% in developed economies.

Similarly, the impact of size is negative across all three categories, but the size of the coefficient varies significantly. The results show that a 1% increase in SIZE reduces profitability by 0.041% in developed economies while a 1% increase in SIZE reduces profitability by 0.037% and 0.01% in small emerging and large emerging economies respectively.

Our results suggest that the impact of LDR on the profitability of banks is positive in developed and small emerging economies but LDR has a negative impact on the profitability of banks in large emerging economies. One possible explanation is that banks in large emerging economies are involved in aggressive lending which reduces the quality of their loan portfolios and increase their non-performing loans. The effect of OFFBS on the profitability of banks in large emerging economies is positive but the effect is insignificant in developed and small emerging economies. It appears that off-balance sheet activities (guarantees, derivatives and commitments) of banks in large emerging economies are more profitable than they are in developed and small emerging economies.

GFC Period vs Non-GFC Period

All variables had the same impact on the profitability of banks during the GFC and non-GFC periods. However, in the case of NPLR, the size of the coefficient varies significantly. NPLR has the same negative impact on profits during the two periods, but the coefficient is larger during GFC period. This shows that a 1% increase NPLR reduced the profitability of banks by 0.07% during the GFC while a 1% increase in NPLR reduced profitability by 0.05% during the non-GFC period.

Table 6.5: Effect of bank-specific variables on ROA across two subsamples

Developed vs. Small emerging and large emerging economies	**NPLR**	**CAR**	**LOG (SIZE)**	**LDR**	**OFFBS**	**COST**
Developed economies (b1.Xit)	-0.0741***	0.0138***	-0.0411***	0.00328***	-0.000392	-0.0351***
b2.D1.Xit	0.0212***	-0.00233	0.00332	0.00193*	-0.00242	0.00241***
b3.D2.Xit	0.0434***	0.00522	0.0295	-0.00913***	0.00529***	-0.00223***
Small emerging economies (b1+b2)	-0.0529***	0.01147***	-0.03778***	0.00521***	-0.002812	-0.03269***
Large emerging economies (b1+b3)	-0.0307***	0.01902***	-0.0116**	-0.00585***	0.004898***	-0.03733***
GFC Period vs. Non-GFC Period	**NPLR**	**CAR**	**LOG (SIZE)**	**LDR**	**OFFBS**	**COST**
GFC Period (Xit)	-0.0749***	0.0147***	-0.0110	0.00282***	0.00147	-0.0354***
Difference (D1.Xit)	0.0276***	-0.000193	0.00541	0.000223	-0.00140	0.00159***
Non-GFC Period	-0.0473***	0.014507***	-0.00559	0.003043***	0.00007	-0.03381***

Notes: The table reports the results for the regression Equation 6.2. Our dependent variable is economic growth. * Significant at 10% level, **Significant at 5% level, ***Significant at 1% level. For first subsample, X_{it} is the coefficient for the explanatory variables for developed economies, $D_1.X_{it}$ is the difference between the coefficient values for developed and small emerging economies and $D_2.X_{it}$ is the difference between the coefficient values for developed and large emerging economies. $D_1 = 1$ if small emerging, 0 otherwise and $D_2 = 1$ if large emerging and 0 otherwise. The sum of X_{it} and $D_1.X_{it}$ is the coefficient for the explanatory variables for small emerging economies and the sum of X_{it} and $D_2.X_{it}$ is the coefficient for the explanatory variables for large emerging economies. For the second subsample, X_{it} is the coefficient for the explanatory variables for GFC period, $D_1.X_{it}$ is the difference between the coefficient values for GFC and non-GFC period and the sum of X_{it} and $D_1.X_{it}$ is the coefficient for the explanatory variables for non-GFC period.

6.5 Conclusion

This chapter investigates the effect of bank-specific, industry-specific and macroeconomic variables on the profitability of banks across ten Asia-Pacific countries. Our sample comprises 649 commercial banks over the period 2004 to 2014.

Our pooled findings with respect to the bank-specific variables suggest that banks that maintain tight control over both credit and costs will be the most profitable. We find a negative relationship between non-performing loans and profits, which suggests that banks with conservative lending policies achieve superior performance. The importance of cost control is highlighted by the strong negative relationship between the cost to income ratio and bank profits. These findings are largely consistent with those of other studies, although they do resolve some uncertainty with respect to whether a bank would benefit from pursuing a conservative or aggressive lending policy. Our results suggest that bank size is inversely related to bank profitability. Furthermore, our results suggest that

increased financial inclusion reduces the profitability of banks and more stringent cash reserve requirements increase profitability. Our findings confirm that banks are more profitable during high interest rate periods. Further, our results suggest that the impacts of some bank-specific variables vary across different economies. For example, loan to deposit ratio has a positive impact on the profitability of banks in small emerging economies and developed economies, but is negatively correlated to the profitability of banks in large emerging economies.

The findings provide evidence of the impact of bank-specific, industry-specific and macroeconomic variables on the profitability of banks in the Asia-Pacific region. The insights provided in this study will assist policy makers to make important decisions pertaining to monetary policy, economic policy and bank regulations.

Chapter 7: Factors Influencing the Profitability of Conventional and Islamic Banks in Four Asian Countries

In this chapter, we investigate the effect of bank-specific, industry-specific and macroeconomic variables on the profitability of conventional and Islamic banks over the period 2004–2014.

7.1 Introduction

In Chapter 6, we investigated the determinants of the profitability of banks in ten countries in the Asia-Pacific region. This chapter focuses on the factors influencing the profitability of the conventional and Islamic banks in four Asian countries – Bangladesh, Indonesia, Malaysia and Pakistan, over the period 2004–2014. It is important to investigate the determinants of the profitability of banks in these four countries because they are still developing and are highly dependent upon having well-functioning and profitable banking sectors to support economic growth. The banks in all four countries operate in a dual banking environment where Islamic banks function in parallel with conventional banks. Islamic banking differs from conventional banks because of their need to be Sharia-compliant. Sharia-compliant finance prohibits charging interest and making profits through speculation. Islamic banking is based on the idea of risk-sharing, which means both parties (the customer and the bank) share both profits and losses. In addition, every transaction in an Islamic bank must be backed by a tangible asset (Beck et al., 2013).

In addition to investigating the determinants of the profitability of banks in these four developing Asian economies, this chapter analyses the differences between the determinants of profitability in conventional and Islamic banks.

Our results suggest that large banks are the better performers, as are banks with superior credit quality. Bank-specific variables affect the profitability of banks more than industry-specific and macroeconomic variables. However, there is strong evidence to suggest that increases to financial inclusion lower the profitability of banks. For macroeconomic variables, our findings confirm that banks benefit from a higher interest rate environment, whereas inflation has a negative impact on their performance. Our results suggest that conventional banks are more profitable than Islamic banks, and Malaysian banks are the poorest performers of all the countries in our study. When comparing the determinants of profitability in Islamic and conventional banks, we find that increased size and high capital adequacy ratios help conventional banks to increase their profitability, but bank size and capital ratios do not explain the profitability of Islamic banks.

7.2 Difference between Islamic and Conventional Banking

Islamic banking is governed by Sharia laws (also known as Islamic laws). Islamic banks must obey these laws and offer products that are Sharia-compliant. Some of the key governing principles that differentiate Islamic banking from conventional banking are: (i) a prohibition on interest (*riba*); (ii) restrictions on speculation (*gharar*); and (iii) restrictions on trade in products that are not in line with Islamic values (*haram*). The fundamental principle underlying every Sharia-compliant banking product is sharing both profits and losses. In order to promote profit and loss sharing, charging interest on loans is prohibited. Sharia law also prohibits speculation (*gharar*). *Gharar*, generally referred to as a risk management tool for Islamic banks which prevents them from carrying out transactions that are excessively risky. In addition, Sharia law prevents Islamic banks from financing or trading in *haram* products such as alcohol and pork (Beck et al., 2013).

Islamic banks offer many lending and deposit products. The most common lending products are *Mudarabah* and *Musharakah*. In *Mudarabah* contracts, which are similar to short-term financing contracts in conventional banks, the profit is shared between bank and customer according to an agreed ratio. However, losses are borne only by banks. The customer has a right to make day-to-day decisions, but for major decsions such as using borrowed money in a new venture, they need to obtain approval from the banks they are borrowing from. *Musharakah* products, which are similar to mortgage products in conventional banking, are based on profit-loss sharing where customer and bank share profits and losses (Aris et al., 2013).

In regard to liability (deposit) products, the most common liability (deposit) products offered by Islamic banks are *Wadiah* and *Mudharabah*. *Wadiah* products are similar to demand deposits in conventional banking. In *Wadiah*, banks are trustees of the funds (Beck et al., 2013). The banks do not provide any interest to depositors, however, in some cases, a *hibah* (gift) is given to depositors as a mark of appreciation for using the funds. A *Mudharabah*, which is similar to a fixed-term deposit account in conventional banks, is a contract between a customer (depositor) and a bank where the customer provides the funds for investment in projects and the bank provides the expertise. The bank invests these funds in a business and the profit is shared between the customer and the bank according to an agreed ratio but if the venture loses money, the loss will be borne by the customer, and the bank will not get any reward for its efforts.

Overall, most Islamic banking products are based on profit-loss sharing. Some Islamic banking products are very similar to conventional banking products. For example, *Wadiah* products are similar to demand deposits in conventional banking, and *Mudarabah* products are like short-term financing in conventional banks.

Islamic banking products are attractive for customers who are religious and firmly believe in Sharia law.

7.3 Data and Methods

Our sample period runs from 2004 to 2014. Table 7.1 shows that our dataset comprises 1,781 bank-year observations from 205 conventional and Islamic banks.[35]

Table 7.1: Number of banks and observations by bank type

Country	[36]Conventional Banks		Islamic Banks		Total	
	Number of banks	Observations	Number of banks	Observations	Number of banks	Observations
Pakistan	23	230	5	51	28	281
Bangladesh	39	317	8	77	47	394
Malaysia	34	303	16	137	50	440
Indonesia	70	605	10	61	80	666
Total	**166**	**1,455**	**39**	**326**	**205**	**1,781**

We investigate the relationship between bank profitability and explanatory variables using ordinary least square (OLS) on random effects.[37]

$$\pi_{it} = \alpha + \sum_{j=1}^{J} \beta_j X_{it}^{j} + \sum_{l=1}^{L} \beta_l X_{it}^{l} + \sum_{m=1}^{M} \beta_m X_{it}^{m} + \sum_{n=1}^{N} \beta_n X_{it}^{n} + \sum_{p=1}^{P} \beta_p X_{i}^{p} + \sum_{q=1}^{Q} \beta_q X_{i}^{q} + \in_{it} \quad (7.1)$$

where π_{it} denotes a measure of the profitability of bank i at time t with i=1, … N and t =1, … T, α is a constant term, X_{it}^{j} indicates bank-specific explanatory variables, X_{it}^{l} refers to industry-specific variables, X_{it}^{m} indicates macroeconomic variables, X_{i}^{n} refers to the dummy variable for GFC, X_{i}^{P} refers to the dummy variable for Islamic banks, X_{i}^{q} is the dummy variable for each country and $\in_{it}$ is an error term.

[35] Please refer to Section 4.2 in Chapter 4 for sources of data and data treatment techniques.
[36] The conventional banks with Islamic windows are treated as conventional banks because they do not maintain separate balance sheets for each of type of banks.
[37] Please refer to Section 4.3.3 in Chapter 4 for more explanation on method.

We run regressions on bank-specific variables first, then we add industry-specific variables and finally we add macroeconomic variables to identify the differences across the estimated results and to check whether the explanatory power of the model increases with the addition of industry-specific and macroeconomic variables.

In order to examine the difference between the determinants of profitability across Islamic and conventional banks and across all Islamic banks (except Malaysia) and all conventional banks (except Malaysia)[38], we use the following equation[39]:

$$\pi_{it} = \alpha + \sum_{j}^{J} \beta_1 X_{it}^{j} + \sum_{j=1}^{J} \beta_2 \mathrm{D}_1 X_{it}^{J} + \sum_{l=1}^{L} \beta_l X_{it}^{l} + \sum_{m=1}^{M} \beta_m X_{it}^{m} + \in_{it} \quad (7.2)$$

where X_{it}^{j} refers to bank-specific explanatory variables, X_{it}^{l} refers to industry-specific variables and X_{it}^{m} indicates macroeconomic variables.

7.3.1 Dependent and Explanatory Variables

Table 7.2 provides a summary of the notations, measurements and expected effects of the variables used in our analysis.[40] We have determined the expected sign based on the findings of prior research and based on intuition.

[38] Please refer to Section 7.4.2 for the reasons behind excluding Malaysia.
[39] Please refer to Section 4.3.4 in Chapter 4 for more explanation on method.
[40] Please refer to Section 2.4 in Chapter 2 and Section 4.4 in Chapter 4 for more explanation on variables.

Table 7.2: Definition of variables, notation and expected effect

Variables	Notation	Measure	Expected Sign
Dependent Variables			
Return on assets	ROA	Profit before tax/Total Assets (%)	
Return on deposits	ROD	Profit before tax/Total Deposits (%)	
Independent Variables			
Bank-specific Determinants			
Non-performing loan ratio	NPLR	Non-performing Loans/Total Loans (%)	-
Capital adequacy ratio	CAR	Tier 1 Capital + Tier 2 Capital / Risk-Weighted Assets (%)	+/-
Total assets (size)	SIZE	Natural log total assets of bank	+
Loans to deposit ratio	LDR	Total Loans / Total Deposits (%)	+/-
Off-balance sheet activities	OFFBS	Off-balance sheets Assets & Debts/Total Assets (%)	+/-
Cost-to-income ratio	COST	Operating Cost / Total Income (%)	-
Industry-specific Determinants			
Bank ownership (dummy)	GOVT	1 for state-owned bank and zero otherwise	-
Cash reserve requirement	CRR	Yearly percentage of deposits maintained by banks (%)	+/-
Financial inclusion	FININC	Number of branches/100,000 adults	+/-
Macroeconomic Determinants			
Inflation	INF	Yearly percentage change in CPI (%)	+
Interest rate	INT	Discount rate of last quarter of calendar year (%)	+
Gross domestic product	GDP	Yearly GDP growth rate (%)	+

Notes: The "+" sign shows that we expect a positive relationship between dependent variable and independent variable. The "-" sign shows that we expect a negative relationship between dependent variable and independent variable. The "+/-" sign shows that there is reason to believe that the relationship could go in either direction.

Table 7.3 (Panel A) reports the descriptive statistics of banks across the full sample and the subsamples. Table 7.3 (Panel B) shows the mean differences for the bank-specific variables across the full sample and the subsamples. Both profitability measures (return on assets (ROA) and average return on deposits (ROD)) of conventional banks are higher than those of Islamic banks and the difference is significant at the 1% confidence level in all countries except Indonesia.

The non-performing loan ratios (NPLRs) of conventional banks are higher than those of Islamic banks in all countries except Indonesia. However, the difference is significant only for Pakistan. It is important to note that the NPLR of conventional banks in Pakistan is 3.63% higher than for Islamic banks, which reflects the poor credit quality of conventional banks. Based on the full sample, the capital adequacy ratio (CAR) of conventional banks is higher than that of Islamic banks. However,

the results are mixed for individual countries. Conventional banks have a higher CAR in Bangladesh and Malaysia but in Indonesia and Pakistan the CAR of conventional banks is lower than the CAR of Islamic banks. The mean difference is significant at the 1% confidence level in Malaysia and Pakistan, and at the 10% confidence level for Bangladesh. The mean difference is insignificant for Indonesia. The results show that conventional banks are larger than Islamic banks. The difference is significant at the 1% confidence level in all countries except Bangladesh. The off-balance sheets activities (OFFBS) of conventional banks are higher than those of Islamic banks and the difference is significant across all four countries. This reflects that conventional banks have more contingent items (guarantees, derivatives and commitments) on their balance sheet than Islamic banks.

The loan to deposit ratios (LDRs) of Islamic banks are higher than those of conventional banks in Bangladesh, Indonesia and Malaysia but the LDRs of Islamic banks is lower than those of conventional banks in Pakistan. The difference is significant in all cases. It is important to note that in Indonesia there is a large variation in LDR between Islamic and conventional banks. The LDR of Islamic banks in Indonesia is 94.46% compared to 78.55% for conventional banks, indicating a more aggressive lending strategy of Indonesian Islamic banks which is consistent with the higher NPLR of Islamic banks. In the case of cost to income ratios (COST), the Islamic banks appear to be at a disadvantage. The results show that conventional banks are more cost-efficient in Indonesia, Malaysia and Pakistan but less cost-efficient in Bangladesh. The difference is significant in Malaysia and Pakistan only. The high cost to income ratio of Islamic banks is probably explained by their need to have more specialist staff because of the nature of their operations.

Table 7.3: Descriptive statistics

Panel A: Subsamples by Type of Banks

	All countries						Bangladesh						Indonesia						Malaysia						Pakistan					
	All Banks		Islamic Banks		Conventional Banks		All Banks		Islamic Banks		Conventional Banks		All Banks		Islamic Banks		Conventional Banks		All Banks		Islamic Banks		Conventional Banks		All Banks		Islamic Banks		Conventional Banks	
	No. of Obs. 1781		No. of Obs. 326		No. of Obs. 1455		No. of Obs. 394		No. of Obs. 77		No. of Obs. 317		No. of Obs. 666		No. of Obs. 61		No. of Obs. 605		No. of Obs. 440		No. of Obs. 137		No. of Obs. 303		No. of Obs. 281		No. of Obs. 51		No. of Obs. 230	
Variable	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
ROA	1.50	1.78	0.81	1.95	1.65	1.71	1.95	1.87	1.34	2.51	2.10	1.65	1.88	1.60	1.58	1.37	1.91	1.62	1.09	1.12	0.65	1.22	1.29	1.02	0.61	2.36	-0.48	2.41	0.85	2.28
ROD	2.00	2.36	1.17	2.49	2.19	2.29	2.41	2.29	1.63	2.82	2.60	2.10	2.61	2.35	2.87	2.86	2.58	2.29	1.49	1.70	0.78	1.43	1.82	1.72	0.75	2.72	-0.55	2.35	1.04	2.72
NPLR	5.68	5.85	5.25	5.47	5.77	5.93	6.90	6.40	6.62	7.27	6.97	6.17	3.72	3.42	4.15	3.44	3.67	3.42	4.14	4.62	3.94	4.69	4.23	4.60	11.01	7.44	8.04	4.79	11.67	7.76
CAR	19.75	14.34	18.88	14.13	19.95	14.39	13.31	10.71	11.30	3.59	13.79	11.77	22.52	14.38	25.31	20.03	22.24	13.67	22.59	16.90	18.65	13.12	24.36	18.09	17.79	10.70	23.24	13.03	16.58	9.73
SIZE	7.37	1.62	7.07	1.56	7.44	1.63	6.82	1.10	6.69	1.05	6.85	1.12	7.08	1.64	6.41	1.35	7.14	1.65	8.40	1.61	8.08	1.06	8.55	1.78	7.24	1.52	5.73	1.85	7.58	1.20
LDR	73.44	23.19	75.33	23.44	73.02	23.12	80.91	14.45	84.15	10.26	80.13	15.21	80.00	22.53	94.46	23.86	78.55	21.88	64.59	28.25	68.24	22.61	62.94	30.35	61.29	14.74	58.19	18.32	61.98	13.77
OFFBS	20.07	11.05	19.10	10.97	20.29	11.05	26.35	11.07	23.34	11.62	27.08	10.82	14.91	9.44	12.72	8.52	15.13	9.50	22.48	10.26	20.36	9.55	23.43	10.44	19.75	9.95	16.95	12.46	20.37	9.22
COST	57.16	27.37	60.26	28.71	56.46	27.02	48.09	22.84	46.25	25.89	48.53	22.06	61.31	22.73	65.21	17.35	60.91	23.18	48.00	23.12	52.61	19.97	45.92	24.15	74.38	37.13	96.06	33.06	69.57	36.32
GOVT	0.11	0.32	0.08	0.28	0.12	0.33	0.14	0.35	0.00	0.00	0.17	0.38	0.07	0.25	0.00	0.00	0.07	0.26	0.14	0.34	0.20	0.40	0.11	0.31	0.16	0.36	0.00	0.00	0.19	0.39
CRR	4.92	1.25	4.50	1.44	5.01	1.18	5.52	0.50	5.48	0.50	5.53	0.50	5.37	0.86	5.30	0.75	5.38	0.88	3.36	1.15	3.23	1.25	3.42	1.10	5.45	0.77	5.45	0.79	5.45	0.77
FININC	8.80	1.93	9.39	1.82	8.67	1.93	7.42	0.49	7.39	0.48	7.43	0.49	8.12	1.96	8.70	1.90	8.06	1.96	11.28	0.53	11.15	0.39	11.34	0.57	8.49	0.55	8.52	0.54	8.48	0.55
INF	6.49	3.19	5.72	3.30	6.66	3.13	7.66	1.40	7.66	1.42	7.66	1.40	6.85	2.49	6.42	2.19	6.89	2.52	2.63	1.13	2.68	1.21	2.60	1.09	10.03	2.61	10.10	2.63	10.01	2.61
INT	6.88	2.97	6.02	3.13	7.08	2.90	6.87	1.62	6.97	1.64	6.84	1.62	7.80	1.84	7.45	1.69	7.83	1.85	3.07	0.23	3.05	0.22	3.08	0.23	10.70	2.17	10.80	2.12	10.67	2.18
GDP	5.44	1.28	5.33	1.44	5.47	1.23	6.11	0.58	6.11	0.61	6.11	0.58	5.65	0.54	5.68	0.52	5.65	0.54	5.35	1.42	5.20	1.54	5.42	1.36	4.17	1.90	4.06	1.85	4.19	1.92

Notes: These variables are selected from a number of available variables. We measured correlations between explanatory variables. The results suggest that there is no multicollinearity issue..[41]

Panel B: Mean difference testing between subsamples

	All banks		Bangladesh		Indonesia		Malaysia		Pakistan	
	Mean Comparison (Conventional-Islamic)		Mean Comparison (Conventional-Islamic)		Mean Comparison (Conventional-Islamic)		Mean Comparison (Conventional-Islamic)		Mean Comparison (Conventional-Islamic)	
Variable	Mean Diff.	*t*-stat.	Mean Diff.	*t*-stat.	Mean Diff.	*t*-stat.	Mean Diff.	*t*-stat.	Mean Diff.	*t*-stat.
ROA	0.84	7.86***	0.76	3.23***	0.33	1.53	0.64	5.72***	1.33	3.73***
ROD	1.02	7.14***	0.97	3.39***	-0.29	-0.92	1.04	6.17***	1.59	3.86***
NPLR	0.52	1.44	0.34	0.42	-0.48	-1.04	0.29	0.61	3.63	3.21***
CAR	1.07	1.21	2.49	1.83*	-3.07	-1.59	5.71	3.32***	-6.66	-4.14***
SIZE	0.37	3.74***	0.16	1.14	0.74	3.37***	0.47	2.87***	1.85	8.89***
LDR	-2.31	-1.62	-4.02	-2.20**	-15.91	-5.37***	-5.29	-1.82*	3.80	1.67*
OFFBS	1.19	1.76*	3.74	2.68***	2.40	1.90*	3.08	2.94***	3.43	2.24**
COST	-3.80	-2.27**	2.28	0.79	-4.30	-1.41	-6.69	-2.83***	-26.49	-4.79***

Notes: The table shows the difference in mean analysis. The mean value of the variables of conventional banks is subtracted from the mean value of the variables of Islamic banks.

[41] Please refer to Appendix 2 (Table A-13).

7.4 Empirical Results

7.4.1 Regression Results and Discussion

Table 7.4 reports aggregate regression results obtained by pooling the results for each of the four countries and running the regression equation as set out in Equation 7.1.

Column 1 shows the results with the bank-specific explanatory variables only, to which we next add the industry-specific variables (Column 2) and we then add the macroeconomic variables (Column 3). Overall, the results show that the explanatory power of the model increases slightly when we add industry-specific and macroeconomic variables.

Panel A reports the results for the profitability measure ROA and Panel B reports the results for the profitability measure ROD. Column 1 and Column 4 show the results with the bank-specific explanatory variables only, to which we next add the industry-specific variables (Column 2 and Column 5) and we then add the macroeconomic variables (Column 3 and Column 6). Overall, the results show that the explanatory power of the model increases slightly when we add industry-specific and macroeconomic variables. In the case of ROA, the adjusted r-squared for the model with all variables included is 62.78%; and in the case of ROD, the adjusted r-squared for the model with all variables included is 61.98%.

Our findings suggest that all the bank-specific variables have a significant impact on the profitability of banks with the exception of the off-balance sheet activities. There is strong evidence that a bank's profitability is negatively correlated to its non-performing loan ratio, and to its cost to income ratio. The sign for these two

variables is consistent with our intuition and the findings in previous studies. Our results suggest that capital adequacy ratio, bank size and loan to deposit ratio have a positive and statistically significant impact on the profitability of banks. The findings related to bank size are consistent with our expectations and previous studies. For example, Hughes and Mester (2013) that large banks benefit from economies of scale due to technical advantage associated with diversification and spreading of information costs that do not increase with the increase in size. Abduh and Idrees (2013) also find a positive relationship between bank size and bank profitability Malaysia. Although there was uncertainty about the direction of the impact of both the capital adequacy ratio and the loan to deposit ratio, our results suggest that the relationship is positive and statistically significant for both variables. These results are consistent with previous studies that have investigated the determinants of profitability. For example, Sufian and Habibullah (2009) and García-Herrero et al. (2009) suggest that banks with a strong capital structure are less likely to default, and that it is therefore easier for such banks to attract low-cost funding. Furthermore, the strong capital structure of banks helps them to withstand a negative economic shock and this provides additional security to depositors (Athanasoglou et al. 2008). Similarly, Berger (1995) also finds a positive relationship between high level of capital and bank profitability and suggests that banks with high capital do not require to borrow funds at a higher cost which increases their profitability. Similarly, some studies find a positive relationship between loan to deposit ratio and the profitability of banks. Tan and Floros (2012b) suggest that when a bank's liquidity is low, this indicates that it has lent out larger amounts in loans and this has generated higher levels of profitability.

There is strong evidence that Islamic banks are less profitable than conventional banks. This finding is consistent with the results of (Hassan, Mohamad, & Khaled

I. Bader, 2009) who suggest that conventional banks are more efficient in terms of managing their costs and profits. This finding also gains some support from the high cost to income ratio (61%) of Islamic banks compared to conventional banks (58%), the high ROA of conventional banks (1.65%) compared to Islamic banks (0.81%). Our results confirm our expectations that the GFC negatively affects the performance of banks across our four countries.

In terms of industry-specific variables, the coefficient of state-owned banks is negative but statistically insignificant. Given that financial inclusion has not been used in previous studies, it was uncertain what effect increased financial inclusion would have on bank profits. We find strong evidence to suggest that the impact is negative. An increase in the number of branches may also increase the operating costs of banks which reduces their profitability. Further, expansion may increase the client base only among customers for whom volume per client and margins are low. This proposition also gains some support from the positive correlation between financial inclusion and cost to income ratio. Similarly, cash reserve requirement is also not used in previous studies, so there was uncertainty about its effect on profitability. Our results suggest that an increase in cash reserves leads to an increase in profitability. It appears that more stringent cash reserve requirements improves the credit quality of the bank's assets which translates into higher profits.

Of the three macroeconomic variables, inflation and interest rate have a significant impact on the profitability of banks. Inflation has a strong negative relationship with bank profitability. Although we predicted a positive relationship, Mirzaei et al. (2013) and Fišerová, Teplý, and Tripe (2015) find a negative effect of inflation on the profitability of banks. It appears that banks in emerging markets increase their lending rates during inflationary periods, which reduces the demand for loans and

lowers their profitability. Interest rate increases have a positive impact on profitability, which is in line with the findings of previous studies.

In Table 7.4 below, Column 4, Column 5 and Column 6 report the results of ROD. Most of these results are consistent with ROA. Except for SIZE, all the bank-specific variables have the same impacts on ROD that they have on ROA. SIZE has a positive impact on ROA while SIZE does not have any significant impact on ROD. All three industry-specific variables have the same impact on ROA and ROD. However, the impact varies across ROA and ROD for the two macroeconomic variables. The impact of interest rates is positive and significant for ROA, but it is insignificant in the case of ROD. In the case of ROA, the impact for GDP growth is negative but insignificant, while GDP growth has a negative and significant effect on the ROD of banks.

Table 7.4: Aggregate regression results of four countries

Variables	**Panel A – ROA**			**Panel B - ROD**		
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Bank-specific variables						
Non-performing loan ratio	-0.0752***	-0.0754***	-0.0776***	-0.0750***	-0.0753***	-0.0776***
	(-13.00)	(-12.97)	(-13.22)	(-9.90)	(-9.93)	(-10.11)
Capital adequacy ratio	0.00958***	0.00982***	0.0101***	0.0187***	0.0190***	0.0190***
	(3.89)	(4.02)	(4.17)	(5.72)	(5.86)	(5.88)
Log (size)	0.0369	0.0798***	0.0793***	-0.0737**	-0.00623	-0.0159
	(1.33)	(2.68)	(2.67)	(-1.97)	(-0.15)	(-0.39)
Loan to deposit ratio	0.00275*	0.00408***	0.00433***	0.0168***	0.0188***	0.0192***
	(1.85)	(2.74)	(2.92)	(8.53)	(9.56)	(9.76)
Off-balance sheet activities	0.0000807	0.000450	0.000256	-0.00152	-0.000912	-0.00115
	(0.03)	(0.15)	(0.09)	(-0.39)	(-0.24)	(-0.30)
Cost to income ratio	-0.0360***	-0.0354***	-0.0357***	-0.0478***	-0.0469***	-0.0472***
	(-27.76)	(-27.49)	(-27.75)	(-27.95)	(-27.69)	(-27.81)
Dummies						
Dummy Islamic	-0.494***	-0.461***	-0.464***	-0.579***	-0.527***	-0.539***
	(-3.88)	(-3.67)	(-3.75)	(-3.15)	(-2.89)	(-2.95)
During GFC	-0.124**	-0.134**	-0.143**	-0.232***	-0.234***	-0.315***
	(-2.07)	(-2.14)	(-1.97)	(-3.01)	(-2.91)	(-3.38)
Bangladesh	0.0991	-0.0148	0.121	-0.153	-0.314	-0.192
	(0.59)	(-0.09)	(0.68)	(-0.63)	(-1.29)	(-0.75)
Malaysia	-1.003***	-0.621***	-0.486**	-1.018***	-0.445*	-0.370
	(-5.94)	(-3.38)	(-2.39)	(-4.18)	(-1.71)	(-1.29)
Indonesia	0.0980	0.0780	0.108	0.196	0.177	0.206
	(0.62)	(0.50)	(0.68)	(0.87)	(0.79)	(0.89)
Industry-specific variables						
State-owned banks		-0.0189	-0.0173		-0.00276	0.0128
		(-0.11)	(-0.11)		(-0.01)	(0.05)
Cash reserve requirement		0.0530*	0.0618**		0.0902**	0.0966***
		(1.93)	(2.24)		(2.56)	(2.73)
Financial inclusion		-0.115***	-0.119***		-0.166***	-0.185***
		(-5.48)	(-5.51)		(-6.43)	(-6.46)
Macroeconomic variables						
Inflation			-0.0430***			-0.0439**
			(-2.97)			(-2.37)
Interest rate			0.0551***			0.0337
			(2.94)			(1.41)
GDP growth			-0.0233			-0.0739**
			(-0.94)			(-2.32)
Constant	3.593***	3.840***	3.795***	4.453***	4.673***	5.300***
	(11.49)	(11.16)	(7.89)	(10.50)	(10.20)	(8.39)
Number of observations	1,781	1,781	1,781	1,781	1,781	1,781
Adjusted R-squared	61.94%	62.58%	62.78%	61.09%	61.85%	61.98%

Notes: Our dependent variables are return on assets and return on deposits. Return on assets is defined as profit before tax as a percentage of total assets of the bank and return on deposits is defined as profit before tax as a percentage of total deposits of the bank. Column (1) and Column (4) show the estimated results for bank-specific variables, Column (2) and Column (5) show results for bank-specific and industry-specific variables and Column (3) and Column (6) show the results for bank-specific, industry-specific and macroeconomic variables. *t*-Values are in parenthesis. * Significant at 10% level, **Significant at 5% level, ***Significant at 1% level.

As reflected in Table 7.4, the results for small emerging markets using ROD as the profitability measure are largely consistent with the results obtained using our key profitability measure ROA. Therefore, we will focus on the subsequent analysis conducted using ROA as the dependent variable.

7.4.2 Effect of Bank-Specific Variables across Two Subsamples (Table 7.5)

Islamic banks are less profitable than conventional banks, and given that Malaysia has the largest Islamic banking sector of the four countries in the study, to get further insights we split the sample up in two different ways: first we split them into Islamic and conventional banks and we then consider all Islamic banks (except Malaysia) and all conventional banks (except Malaysia). The analysis is conducted using the regression set out in Equation 7.2.

Islamic banks vs. conventional banks

We find in our pooled results that Islamic banks are less profitable than conventional banks. In order to get more insights, we first analyse the data by splitting the sample into Islamic and conventional banks.

Four variables (NPLR, COST, LDR and OFFBS) have the same impact on the profitability of Islamic and conventional banks. NPLR and COST have a negative impact on the profitability of the both Islamic and conventional banks. The impact of LDR on profitability is positive across Islamic and conventional banks. The impact of OFFBS is insignificant across both types of banks. All these results are consistent with the findings of the pooled data.

The impacts of CAR and SIZE vary across Islamic and conventional banks. CAR and SIZE have a positive impact on the profitability of conventional banks but the effect of both variables on the profitability of Islamic banks is insignificant.

Islamic banks (except Malaysia) vs. Conventional Banks (Except Malaysia)

Given that Malaysia has the largest Islamic banking sector of the four countries in this study, we analyse the data by further splitting the sample up into all Islamic banks (except Malaysia) and all conventional banks (except Malaysia) to see the extent to which the results of Malaysia are influencing the overall results.

Our results suggest that the impact of NPLR, OFFBS and COST is the same across both subsamples. However, the impacts of CAR, SIZE and LDR vary across the two subsamples. The impact of CAR on the profitability of all Islamic banks is insignificant, but when we exclude Malaysian banks from the sample, we find a significant and positive impact of CAR on profitability. Similarly, bank size has an insignificant effect on the profitability of all Islamic banks combined, but when we remove Malaysian banks, the impacts of increases in SIZE are significant and positive. This indicates that the results associated with CAR and SIZE are driven by Malaysian banks. On the other hand, we find a positive impact of LDR on the profitability of all Islamic banks but when we exclude Malaysian banks, we find that LDR does not have any impact on the profitability of banks. In this case, it appears that the banks in other three countries are driving this result.

Table 7.5: Effect of bank-specific variables on profitability across subsamples

Islamic vs. Conventional banks	**NPLR**	**CAR**	**LOG (SIZE)**	**LDR**	**OFFBS**	**COST**
Islamic banks (Xit)	-0.0840***	0.0003	0.0314	0.00627***	0.00263	-0.0354***
Difference (D.Xit)	0.00747	0.0109**	0.0641*	-0.00439	-0.00261	-0.000406
Conventional banks	-0.07653***	0.011181***	0.0955***	0.00188***	0.00002	-0.035806***
Islamic and Conventional banks (Exc Malaysia)	**NPLR**	**CAR**	**LOG (SIZE)**	**LDR**	**OFFBS**	**COST**
All Islamic banks except Malaysia (Xit)	-0.0711***	0.0298***	0.129**	-0.00461	0.00233	-0.0418***
Difference (D.Xit)	-0.0227	-0.0187**	-0.0376	0.0109**	-0.00203	0.00524
All conventional banks except Malaysia	-0.0938***	0.0111***	0.0914**	0.00629***	0.0003	-0.03656***

Notes: The table reports the result for the regression Equation 7.2. Our dependent variable is return on assets which is defined as profit before tax as a percentage of total equity of the bank. * Significant at 10% level, **Significant at 5% level, ***Significant at 1% level. D.Xit is used to examine the effect of bank-specific variables across the subsamples. In the first subsample, D takes the value of zero if the banks are Islamic the value of 1 if the banks are conventional. In the second subsample, D will take a value of zero if the banks are Islamic banks of all other countries (except Malaysia) and D will take a value of 1 if the banks the banks conventional banks from all other countries (except Malaysia).

7.5 Conclusion

This study investigates the effect that bank-specific, industry-specific and macroeconomics variables have on the profitability of conventional and Islamic banks in four countries in the Asian region. Our sample comprises 205 conventional and Islamic banks in Bangladesh, Indonesia, Malaysia and Pakistan over the period 2004 to 2014.

Our pooled findings with respect to bank-specific variables suggest that large banks that maintain tight control over both credit and costs will be the most profitable banks. We see that the total asset size of a bank is positively correlated with its level of profit. We find a negative relationship between non-performing loans and profits, which suggests that banks with conservative lending policies achieve superior performance. The importance of cost control is highlighted by the strong negative relationship between the cost to income ratio and bank profits. These findings are largely consistent with those of other studies, although they do resolve some uncertainty with respect to whether a bank will benefit from pursuing a conservative or aggressive lending policy.

In terms of industry-specific variables, our results suggest that increased financial inclusion increases overheads and reduces bank profitability, while banks with high cash reserves are more profitable than banks with low cash reserves. Two macroeconomic variables, inflation and interest rates, have a significant impact on the profits of banks. Our findings confirm that banks are more profitable during periods of low inflation and periods with high interest rates.

We find strong evidence to suggest that Islamic banks are less profitable than conventional banks. This finding is consistent with the results of (Hassan et al., 2009) who suggest that conventional banks are more efficient in terms of managing

their costs and profits. One issue that we address is the relative levels of profitability of banks in each of the four countries. We find strong evidence to suggest that Malaysian banks are the least profitable. The other question of interest is: Do the explanatory variables impact differently across Islamic and conventional banks? Some of our key findings related to this question are that the impacts of capital adequacy ratio and bank size vary across Islamic and conventional banks. Neither variable plays a role in explaining the profits of Islamic banks, whereas they have a positive and significant impact on the profitability of conventional banks. These findings will assist policy makers to decide whether Islamic banks need to be the same regulations as conventional banks or whether they require a different set of regulations.

When comparing our results with our aggregate results for all ten countries in Chapter 6 (Table 6.4), we find two instances where the impacts of variables on bank profitability are different. Bank size has a negative impact on the profitability of banks in all ten countries, but bank size has a positive influence on the profitability of banks in the four small emerging economies. Further, the impact of the macroeconomic variable (inflation) is insignificant in our aggregate results, but inflation has a negative impact on the profitability of the four developing economies.

We stressed at the beginning of the chapter the importance of a well-performing banking sector to the development of emerging countries. In this paper we have identified a number of factors that are important in explaining variations in the profitability of banks across our four countries. This provides insights into the foundations of a banking system best able to meet the funding needs of a developing economy.

Chapter 8: Factors Influencing the Profitability of Banks in India and China

This chapter investigates the effect of bank-specific, industry-specific and macroeconomic variables on the profitability of commercial banks in India and China over the period 2004 to 2014.

8.1 Introduction

In this chapter, we investigate the determinants of the profitability of commercial banks in India and China over the period 2004–2014. The banking sector is particularly important for countries that are experiencing rapid economic growth such as India and China which have both shown an average annual growth in excess of 7% over the last five years. The Chinese banking sector is larger, with total bank assets of US$ 28.3 trillion which equates to 270% of Chinese GDP as compared to the US$ 1.8 trillion assets of Indian banks which represents 88% of Indian GDP. The banks in the two countries operate in similar regulatory environments, with all the banks being required to maintain minimum capital adequacy ratios and cash reserve requirements which are varied over time. Currently, the banks in both countries are facing problems related to funding shortfalls and growing non-performing loans that negatively impact on their profitability. The non-performing loan ratio of Indian banks (4.35%) and Chinese banks (1.1%) are higher than they are in many countries such as Hong Kong (0.5%), Singapore (0.75%) and Australia (0.96%). In addition to investigating the determinants of the profitability of banks, this chapter identifies the differences between the determinants of profitability in Indian and Chinese banks for our overall data sample, and for subsets of our sample (i.e. foreign versus local banks, state-owned versus private banks, and during the Global Financial Crisis (GFC) versus non-GFC periods.

Our results suggest that credit quality, capital adequacy and cost management are the key factors behind the profitability of banks in India and China. Bank size is also important in determining profitability. It has a positive impact on the profitability of banks in India but a less expected negative impact on the profitability of banks in China. Although the bank-specific variables prove more important in explaining bank profitability than the industry-specific and macroeconomic variables, inflation and financial inclusion are other variables that prove to have significant explanatory power. There is strong evidence to suggest that privately-owned banks outperform state-owned banks in India and that the profitability of banks in neither country were significantly impacted by the GFC.

8.2 Data and Method

Our sample period runs from 2004 to 2014 and we can see from Table 8.1 that our dataset comprises 1,667 bank-year observations from 217 banks in India and China.[42]

Table 8.1: Number of banks and observations by country and type of bank

Country	Local banks		Foreign banks		Total	
	Number of banks	Observations	Number of banks	Observations	Number of banks	Observations
India	50	505	8	72	58	577
China	130	903	29	187	159	1,090
Total	**180**	**1,408**	**37**	**259**	**217**	**1,667**

We investigate the impact of bank-specific, industry-specific and macroeconomic variables on the profitability of banks using ordinary least square (OLS) incorporating random effects[43]. We run the regression on India and China separately using the following equation:

$$\pi_{it} = \alpha + \sum_{j=1}^{J} \beta_j X_{it}^{j} + \sum_{l=1}^{L} \beta_l X_{it}^{l} + \sum_{m=1}^{M} \beta_m X_{it}^{m} + \sum_{n=1}^{N} \beta_n X_{i}^{n} + \sum_{p=1}^{P} \beta_p X_{i}^{p} + \in_{it} \quad (8.1)$$

[42] Please refer to Section 4.2 in Chapter 4 for sources of data and data treatment techniques.
[43] Please refer to Section 4.3.3 in Chapter 4 for more explanation on method.

where π_{it} refers to a measure of the profitability of bank i at time t with i=1, … N and t=1, … T, α is a constant term, X_{it}^{j} indicates bank-specific explanatory variables, X_{it}^{l} refers to industry-specific variables, X_{it}^{m} indicates macroeconomic variables, X_{i}^{n} refers to a dummy variable for GFC and X_{i}^{p} refers to a dummy variable for foreign banks.

In all the cases, we will run a regression on bank-specific variables first. Next we will add industry-specific variables, and finally, we will add macroeconomic variables to identify the differences across the estimated results, and to check the extent to which the explanatory power of the model increases with the addition of industry-specific and macroeconomic variables.

In order to examine the differences between the determinants of profitability across Indian and Chinese banks both in aggregate and when the banks are separated on the basis of whether they are local or foreign, state-owned or private banks, and whether the period being studied lies inside or outside the GFC, we use the following equation: [44]

$$\pi_{it} = \alpha + \sum_{j}^{J} \beta_1 X_{it}^{j} + \sum_{j=1}^{J} \beta_2 \mathrm{D}_1 X_{it}^{J} + \sum_{l=1}^{L} \beta_l X_{it}^{l} + \sum_{m=1}^{M} \beta_m X_{it}^{m} + \in_{it} \quad (8.2)$$

where X_{it}^{j} refers to bank-specific explanatory variables, X_{it}^{l} refers to industry-specific variables and X_{it}^{m} indicates macroeconomic variables.

8.2.1 Dependent and Explanatory Variables

Table 8.2 provides a summary of the dependent and independent variables. It includes the notations, measurements and expected effects.[45] We have used ROA as a measure of bank profitability. ROA is the most widely used measure in the

[44] Please refer to Section 4.3.4 in Chapter 4 for more explanation on method.
[45] Please refer to Section 2.4 in Chapter 2 and Section 4.4 in Chapter 4 for more explanation on variables.

literature. We have also used ROD for the sake of robustness of the results. The expected effect is based on findings in the literature and on intuition.

Table 8.2: Definitions of variables, notation and expected effects

Variables	Notation	Measure	Expected Sign
Dependent Variable			
Return on assets	ROA	Profit before tax/Total Assets (%)	
Return on deposits	ROD	Profit before tax/Total Deposits (%)	
Independent Variables			
Bank-specific Determinants			
Non-performing loan ratio	NPLR	Non-performing Loans/Total Loans (%)	-
Capital adequacy ratio	CAR	Tier 1 Capital + Tier 2 Capital / Risk-Weighted Assets (%)	+/-
Total assets (bank size)	SIZE	Natural log of total assets of bank	+
Loans to deposit ratio	LDR	Total Loans / Total Deposits (%)	+/-
Off-balance sheet activities ratio	OFFBS	Off-balance sheets Items/Total Assets (%)	+/-
Cost to income ratio	COST	Operating Cost / Total Income (%)	-
Industry-specific Determinants			
Bank ownership (dummy)	GOVT	1 for state-owned bank and zero otherwise	-
Cash reserve requirement	CRR	Yearly percentage of deposits maintained by banks (%)	+/-
Financial inclusion	FININC	Number of branches/100,000 adults	+/-
Macroeconomic Determinants			
Inflation	INF	Yearly percentage change in CPI (%)	+
Interest rate	INT	Discount rate of last quarter of calendar year (%)	+
Gross domestic product	GDP	Yearly GDP growth rate (%)	+

Notes: The "+" sign shows that we expect a positive relationship between dependent variable and independent variable. The "-" sign shows that we expect a negative relationship between dependent variable and independent variable. The "+/-" sign shows that there is reason to believe that the relationship could go in either direction.

Table 8.3 reports the descriptive statistics of the dependent and independent variables for banks in India and China. The results of both profitability measures, return on assets (ROA) and return on deposits (ROD), suggest that the profitability of Indian banks is slightly higher than Chinese banks, and that the difference is significant at the 10% confidence level for ROA and at 1% for ROD.

The mean non-performing loan ratio (NPLR) of Indian banks is 1.82% higher than it is for Chinese banks, reflecting the poor credit quality of Indian banks. The loan to deposit ratio (LDR) of Indian banks is 66.83% and for Chinese banks it is 56.36%, indicating the aggressive lending strategies of Indian banks which may be one the reasons behind their high NPLR. The cost to income ratio (COST) of Indian banks is 47.47% compared to 40.79% for Chinese banks, reflecting that Chinese banks are better in terms of managing their costs. The capital adequacy ratio (CAR) of

Chinese banks is slightly higher than it is for Indian banks. Similarly, Chinese banks are larger than Indian banks. The mean difference is significant at the 1% confidence level for all these variables.

For the industry-specific variables, the results show banks in China maintain more cash reserves (16.06%) than banks in India (5.62%). Financial inclusion (FININC) data shows that there are 10.25 branches per 100,000 people in India compared to 7.57 per 100,000 in China. In both the cases the mean difference is significant at the 1% confidence level.

There is a large variation in both countries in relation to macroeconomic indicators. India has, on average, a high inflation rate (8%) compared to China (3%). Similarly, the average interest rate in India (6.79%) is higher than the average interest in China (6.03%). However, China has witnessed higher GDP growth (9.59%) compared to GDP growth (7.68%) in India. The mean difference is significant at the 1% confidence level for all these variables.

Table 8.3: Descriptive statistics of variables over the period 2004–2014

Variable	**China (Obs: 1,090)**		**India (Obs: 577)**		**Mean Comparison (China – India)**	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean Diff.	*t*-stat.
Bank profitability						
Return on assets (%)	1.34	0.61	1.41	0.90	-0.07	-1.66*
Return of deposits (%)	1.56	0.78	1.79	1.36	-0.23	-3.56***
Bank-specific variables						
Non-performing loan ratio (%)	1.71	1.88	3.53	2.75	-1.82	-14.91***
Capital adequacy ratio (%)	15.04	8.40	14.04	3.42	1.00	2.33**
Total assets (bank size)	4.06	0.99	3.90	0.71	0.16	3.44***
Loan to deposit ratio (%)	56.36	13.93	66.83	9.29	-10.47	-15.47***
Off-balance sheet activities ratio (%)	20.40	12.52	21.79	10.94	-1.39	-2.31**
Cost to income ratio (%)	40.79	12.76	47.47	8.04	-6.68	-11.08***
Industry-specific variables						
State-owned banks (dummy)	0.07	0.25	0.50	0.50	-0.43	-23.22***
Cash reserve requirement (%)	16.06	3.88	5.62	1.13	10.43	63.16***
Financial inclusion	7.57	0.37	10.25	1.33	-2.68	-62.38***
Macroeconomic variables						
Inflation (%)	3.00	1.79	8.00	2.61	-5.00	-46.04***
Interest rate (%)	6.03	0.57	6.79	1.10	-0.76	-18.47***
GDP growth (%)	9.59	2.02	7.68	1.91	1.91	18.63***

Notes: These variables are selected from a number of available variables. We measure correlations between explanatory variables. The results suggest that there is no multicollinearity issue.[46]

8.3 Empirical Results

8.3.1 Regression Results and Discussion

Table 8.4 and Table 8.5 report the regression results for India and China[47] respectively. These results are obtained through the regression as set out in Equation 8.1. Panel A reports the results for the profitability measure ROA and Panel B reports the results for profitability measure ROD. Column 1 and Column 4 show the results for the bank-specific explanatory variables only, to which we next add the industry-specific variables (Column 2 and Column 5) and we then further add the macroeconomic variables (Column 3 and Column 6). Overall, the results show that the explanatory power of the model increases slightly when we add industry-specific and macroeconomic variables. In the case of ROA, the adjusted r-squared for the model with all variables included is 68.12% for India and 57.76% for China,

[46] Please refer to Appendix 2 (Tables A-14 and A-15).

[47] We also ran a regression by pooling the data for the two countries. We used a country dummy in that regression, and found that Indian banks are more profitable than banks in China. These results are not reported, as the coefficients attached to the explanatory variables represent some kind of average of the coefficients already discussed for the individual countries.

and in case of ROD, the adjusted r-squared for the model with all variables included is 70.5% for India and 48.56% for China.

India (Table 8.4)

As predicted, we find for Indian banks a strong negative relationship between both NPLR and COST and bank profitability. In terms of economic significance, the results show COST has more negative impact on bank profitability than NPLR; 1% increase in NPLR reduces bank profitability by 0.13% but 1% increase in COST reduces the profitability by 1.9%. In contrast, we find that a bank's CAR and its SIZE have significant positive relationships with bank profitability. The finding related to SIZE is as expected and in line with the studies by Timme (1993) Pasiouras and Kosmidou (2007) and Hughes and Mester (2013), but in the case of CAR, there was uncertainty as to the direction of its impact on profits. One possible explanation for the positive relationship is that banks with high capital holdings are considered safe, as high capital holdings help them to absorb shocks caused by adverse movements in the economy (Athanasoglou et al., 2008). The other possible explanation is that the banks with high capital require less debt finance which reduces their interest expense and increase their earnings (Berger, 1995). There is weak evidence that a high LDR reduces the profitability of banks, which is suggestive of Indian banks extending loans to a point where they are compromising their credit quality.

Two of the industry-specific variables that have a statistically significant effect on bank profitability are bank ownership and FININC. Our findings support previous findings in the literature that state-owned banks are less profitable than private banks. For example, Berger, Clarke, Cull, Klapper and Udell, (2005) suggest that state-owned banks are less efficient and have high level of non-performing loans due to different objectives associated with development of specific industries and

promoting exports. Further, Iannotta et al. (2007) and Dietrich and Wanzenried (2009) also argue that state-owned banks are less profitable due to higher operating costs and outdated technology. FININC has not been used in previous studies. Therefore, it was not possible to predict the effect that more FININC would have on banking profits. We find strong evidence to suggest that the impact is negative. There are two possible explanations. First, extending banking services to a larger portion of the population may result in an increase in the default rates, which lowers profitability. This proposition gains some support from the positive correlation between FININC and the NPLR. Second, an increase in the number of branches may also increase the operating costs of banks, which reduces their profitability. Again, this gains some support from the positive correlation between FININC and COST.

Of the macroeconomic variables, the only one that has a strong impact is INF which has a strong negative relationship with bank profitability. Although we predicted a positive relationship, Mirzaei et al. (2013) also find a negative relationship which they put down to Indian banks being poor forecasters of future rates of inflation. We learn from our dummy variables that foreign banks in India are more profitable than their local counterparts. This is consistent with the findings of Shanmugam and Das (2004) which suggest that foreign banks in India are more efficient than nationalised banks and domestic private banks. Finally, our findings indicate that the performance of Indian banks was largely unaffected by the Global Financial Crisis in 2008–2009.

Column 4, Column 5 and Column 6 report the results of ROD. These results largely confirm the results of ROA. The bank-specific variables NPLR and COST both have a negative impact on ROD, as case with ROA. Similarly, CAR has a positive impact on both profitability measures. SIZE had a positive and statistically

significant impact when we used ROA, however, in the case of ROD, the coefficient for SIZE is insignificant, which shows that SIZE does not explain changes to profitability when it is measured with ROD. The results of all the industry-specific and macroeconomic variables are consistent with the results of ROA.

China (Table 8.5)

Our findings for China show that all the bank-specific variables have a significant impact on the profitability of banks, except for the banks' OFFBS. There is strong evidence that each of NPLR, SIZE and COST has a negative relationship with bank profitability in China. The only one of these that is obviously at variance with expectations is SIZE which one might think would have a positive impact on profits. However, two recent studies on Chinese banks have also find a negative relationship between SIZE and bank profitability. Tan and Floros (2012a) and Tan (2016) both find a negative relationship, the former putting it down to the fact that smaller banks find it easier to deal with bureaucracy and the latter suggesting that management in smaller banks finds it easier to concentrate on key profitable segments. Furthermore, Berger, Miller, Petersen, Rajan and Stein (2005) also suggest that small banks are more profitable. They argue that small banks maintain strong relationships with small and medium enterprises (SMEs) and SMEs prefer to borrow from small banks. For CAR and LDR we were uncertain as to the direction of their expected impacts on profits. Our results suggest that the relationship is positive and statistically significant in both cases. These results are consistent with previous studies by Sufian and Habibullah (2009) and García-Herrero et al. (2009). Similarly, some studies find a positive relationship between LDR and the profitability of Chinese banks. Tan and Floros (2012a) suggest that the low liquidity of banks indicates that they have lent large amounts, and this has generated a higher level of profitability. There is some evidence that banks with

high CRR are more profitable. We find weak evidence that the FININC has a negative impact on the profitability of Chinese banks which is consistent with our findings for India.

All three macroeconomic variables have a significant impact on the performance of Chinese banks. In line with the findings of previous studies, we find that both the INF and INT have a positive impact on the performance of Chinese banks. Surprisingly, GDP growth has a negative impact on the profitability of Chinese banks. However, this is consistent with the findings of (Tan & Floros, 2012b) who suggest that economic growth improves the performance of businesses, but it reduces the barriers to entry for banks. Our dummy variable for foreign banks is significant and negative, indicating that local banks are more profitable than foreign banks in China. The lower profitability of foreign banks is a function of the strict requirements placed on them by the Chinese government to limit their access to some of the most profitable segments such as providing foreign exchange facilities (Avkiran, Zhu, Tripe, & Walsh, 2015; Heffernan & Fu, 2010). Further, foreign banks also face challenges associated with economic and regulatory environments which potentially affects their profitability. Finally, as with India, our findings suggest that the performance of Chinese banks was unaffected by the Global Financial Crisis of 2008–2009.

Column 4, Column 5 and Column 6 report the results of ROD. Similar to India, the results of ROD are largely consistent with the results of ROA. All the bank-specific variables have the same impact on ROD, as in the case of ROA. The industry-specific variable FININC had a negative impact on ROA, but is statsitically insignificant in explaining ROD. Similarly, the macroeconomic variable, interest rate, had a positive impact on ROA, but interest rates do not have any impact on

ROD. In the case of ROA, we find that foreign banks are less profitable than local banks, but for ROD, the coefficient for foreign banks is statistically insignificant.

Table 8.4: Regression results of India

Variables	**Panel A - ROA**			**Panel B – ROD**		
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Bank-specific variables						
Non-performing loan ratio	-0.0402***	-0.0405***	-0.0533***	-0.0391***	-0.0375***	-0.0516***
	(-4.22)	(-4.31)	(-5.43)	(-2.94)	(-2.82)	(-3.70)
Capital adequacy ratio	0.0519***	0.0516***	0.0635***	0.0925***	0.0927***	0.107***
	(5.56)	(5.63)	(6.80)	(7.02)	(7.05)	(8.05)
Log (bank size)	-0.118**	0.0696	0.128**	-0.200**	0.00955	0.113
	(-2.13)	(1.10)	(1.99)	(-2.48)	(0.10)	(1.22)
Loan to deposit ratio	-0.00788***	-0.00373	-0.00107	-0.00531	-0.00156	0.00141
	(-2.69)	(-1.24)	(-0.35)	(-1.30)	(-0.37)	(0.32)
Off-balance sheet activities ratio	0.00200	-0.00354	-0.00374	0.00311	-0.00217	-0.00243
	(0.77)	(-1.29)	(-1.38)	(0.84)	(-0.55)	(-0.63)
Cost to income ratio	-0.0567***	-0.0580***	-0.0582***	-0.0744***	-0.0758***	-0.0767***
	(-17.11)	(-17.86)	(-18.16)	(-16.04)	(-16.45)	(-16.80)
Industry-specific variables						
State-owned banks		-0.252**	-0.285***		-0.298*	-0.370**
		(-2.34)	(-2.65)		(-1.79)	(-2.35)
Cash reserve requirement		0.0166	-0.0139		0.0339	-0.0114
		(0.88)	(-0.69)		(1.29)	(-0.40)
Financial inclusion		-0.0992***	-0.0813***		-0.0897***	-0.0612*
		(-4.82)	(-3.18)		(-3.06)	(-1.68)
Macroeconomic variables						
Inflation			-0.0529***			-0.0701***
			(-4.57)			(-4.26)
Interest rate			0.0433			0.122
			(0.73)			(1.45)
GDP growth			0.0172			0.0492
			(0.61)			(1.24)
Dummies						
Foreign banks	0.859***	0.829***	0.821***	1.711***	1.661***	1.636***
	(6.22)	(6.26)	(6.22)	(8.20)	(8.09)	(8.49)
During GFC	0.0797	-0.00723	0.240	0.133*	0.0424	0.563*
	(1.58)	(-0.14)	(1.16)	(1.92)	(0.57)	(1.92)
Constant	4.335***	4.590***	4.043***	4.983***	5.002***	3.562***
	(11.38)	(11.16)	(5.21)	(9.26)	(8.56)	(3.23)
Number of observations	577	577	577	577	577	577
Number of years (2004–2014)	11	11	11	11	11	11
Adjusted r-squared	61.25%	66.06%	68.12%	65.39%	68.59%	70.5%

Notes: Our dependent variables are return on assets and return on deposits. Return on assets is defined as profit before tax as a percentage of total assets of the bank and return on deposits is defined as profit before tax as a percentage of total deposits of the bank. Column (1) and Column (4) show the estimated results for bank-specific variables, Column (2) and Column (5) show results for bank-specific and industry-specific variables and Column (3) and Column (6) show the results for bank-specific, industry-specific and macroeconomic variables. *t*-Values are in parenthesis. * Significant at 10% level, **Significant at 5% level, ***Significant at 1% level.

Table 8.5: Regression results of China

Variables	Panel A – ROA			Panel B – ROD		
	(1)	(2)	(3)	(4)	(5)	(6)
Bank-specific variables						
Non-performing loan ratio	-0.0647***	-0.0552***	-0.0533***	-0.0676***	-0.0590***	-0.0579***
	(-9.22)	(-7.54)	(-7.24)	(-7.41)	(-6.20)	(-6.03)
Capital adequacy ratio	0.0143***	0.0128***	0.0119***	0.0265***	0.0247***	0.0237***
	(6.05)	(5.41)	(5.19)	(8.47)	(7.90)	(7.80)
Log (size)	-0.0281	-0.0617**	-0.0851***	0.0184	-0.0373	-0.0709*
	(-1.13)	(-2.25)	(-3.11)	(0.56)	(-1.02)	(-1.93)
Loan to deposit ratio	0.000748	0.00185*	0.00332***	0.00399***	0.00504***	0.00683***
	(0.70)	(1.68)	(2.95)	(2.84)	(3.50)	(4.59)
Off-balance sheet activities ratio	0.000597	0.000779	0.000666	0.000286	0.000422	0.000231
	(0.53)	(0.70)	(0.61)	(0.20)	(0.29)	(0.16)
Cost to income ratio	-0.0316***	-0.0321***	-0.0308***	-0.0383***	-0.0390***	-0.0375***
	(-23.71)	(-24.17)	(-23.28)	(-22.06)	(-22.48)	(-21.60)
Industry-specific variables						
State-owned banks		0.00975	0.0393		0.207	0.251
		(0.07)	(0.29)		(1.02)	(1.35)
Cash reserve requirement		0.0139***	-0.000626		0.0167***	-0.00210
		(4.13)	(-0.13)		(3.81)	(-0.32)
Financial inclusion		-0.0111	-0.0822*		0.0284	-0.0667
		(-0.34)	(-1.94)		(0.65)	(-1.16)
Macroeconomic variables						
Inflation			0.0290***			0.0379***
			(4.04)			(4.07)
Interest rate			0.0599**			0.0575
			(1.99)			(1.46)
GDP growth			-0.0478***			-0.0583***
			(-4.75)			(-4.40)
Dummies						
Foreign banks	-0.162*	-0.158*	-0.183**	-0.0123	-0.0162	-0.0537
	(-1.93)	(-1.92)	(-2.41)	(-0.11)	(-0.14)	(-0.52)
During GFC	0.0130	0.00705	0.0254	0.0184	0.0200	0.0259
	(0.48)	(0.25)	(0.63)	(0.52)	(0.55)	(0.49)
Constant	2.643***	2.596***	3.346***	2.593***	2.293***	3.404***
	(16.27)	(8.59)	(6.72)	(12.01)	(5.70)	(5.10)
Number of observations	1090	1090	1090	1090	1090	1090
Number of years (2004–2014)	11	11	11	11	11	11
Adjusted r-squared	49.93%	50.87%	51.76%	45.37%	47.25%	48.56%

Notes: Our dependent variables are return on assets and return on deposits. Return on assets is defined as profit before tax as a percentage of total assets of the bank and return on deposits is defined as profit before tax as a percentage of total deposits of the bank. Column (1) and Column (4) show the estimated results for bank-specific variables, Column (2) and Column (5) show results for bank-specific and industry-specific variables and Column (3) and Column (6) show the results for bank-specific, industry-specific and macroeconomic variables. *t*-Values are in parenthesis. * Significant at 10% level, **Significant at 5% level, ***Significant at 1% level.

As reflected in Table 8.4 and Table 8.5, the results for India and China using ROD as the profitability measure are largely consistent with our results when ROA is the dependent variable. Hence, we concentrate our future investigation on the analysis conducted using ROA as the dependent variable.

8.3.2 Effect of Bank-Specific Variables across Banks in India and China Based on Pooled Data

Banks in India versus Banks in China (Table 8.6)

Table 8.6 reports on how the impact of the bank-specific variables differs across Indian and Chinese banks. The analysis is conducted using the regression set out in Equation 8.2. Our major finding is that there is a significant difference in the impact that four of our six bank-specific variables have on the profitability of banks in India and China. Perhaps the most interesting of these differences is that SIZE has a positive impact on profitability in India but a negative impact in China. It appears that banks in India can take advantage of economies of scale, which is also reflected in a negative correlation between SIZE and COST. On the other hand, our findings for China are in line with the results of (Tan, 2016) that suggest that the managers of smaller Chinese banks are more able to focus on key profitable segments, which helps them to increase profitability.

The other three variables for which the impact differs are LDR, CAR and COST. LDR has a positive and significant effect on bank profits in China but there is no statistically significant relationship between LDR and bank profits in India. It suggests that banks in China more effectively manage their loan portfolios, with an increase in loans leading to an increase in their profitability. This finding has some support from the low NPLR (1.71%) of Chinese banks compared to the NPLR (3.53%) of Indian banks. CAR has a positive effect on bank profitability in both countries, but this impact is much greater in India where a 1% increase in CAR

causes bank profits to increase by more than three times the impact in China. One possible explanation is that well-capitalised banks in India are better at attracting low-cost deposits compared to well capital capitalised banks in China. In both countries, a higher COST translates into significantly lower profits but this impact is significantly higher in India than it is in China.

The other two variables which have a similar effect in both countries are NPLR and OFFBS. NPLR has a negative impact on profitability in both India and China, while OFFBS is found to have no impact on profits in either country.

Table 8.6: Effect of bank-specific variables on ROA of banks in India and banks in China

Subsample	NPLR	CAR	SIZE	LDR	OFFBS	COST
India (X_{it})	-0.0458***	0.0467***	0.256***	-0.00300	-0.000863	-0.0478***
Difference ($D.X_{it}$)	0.000201	-0.0329***	-0.264***	0.00580**	0.00178	0.0148***
China	-0.045***	0.0138***	-0.008***	0.0028**	0.0009	-0.033***

Notes: The table reports the result for the regression Equation 8.2. Our dependent variable is return on assets which is defined as profit before tax as a percentage of the total assets of the bank. * Significant at 10% level, **Significant at 5% level, ***Significant at 1% level. $D.X_{it}$ is used to examine the possible different relationships of bank-specific variables for Indian and Chinese banks. D will take the value of zero for Indian banks and a value of 1 for Chinese banks.

8.3.3 Effect of Bank-Specific Variables across Different Categories of Bank

In this section, we analyse the data for each of the two countries by splitting the sample in three different ways: local and foreign banks; banks during the GFC period and non-GFC period; and state-owned and private banks. The analysis is also conducted using the regression set out in Equation 8.2.

India (Table 8.7)

Table 8.7 highlights how the impact of the bank-specific variables on the profitability of Indian banks differs between local and foreign banks, between the GFC and non-GFC periods, and between state-owned banks and privately-owned banks. Three of the variables have the same impact on the profitability of banks across all categories, and these results are consistent with the results we reported for the pooled data: NPLR and COST have a negative impact on bank profits across

all categories and CAR always has a positive impact. With respect to each of these variables, there are some points to note. First, NPLR has a much greater negative impact on the profitability of local banks than it does on foreign banks. Second, COST has a much greater negative impact on the profitability of foreign and private banks than it does on local banks and state-owned banks.

As always, SIZE is an interesting variable. In most cases SIZE maintains the positive relationship with profitability that we have highlighted previously. However, there is one major exception, with SIZE having a negative impact on the profits of state-owned banks whereas the typical positive relationship is maintained for private banks. A possible explanation for SIZE having a negative effect on the profits of state-owned banks is that state-owned banks in India less efficiently use their resources as reflected by their higher cost to income ratio (48%) compared to cost to income ratio (46.9%) of private banks. This finding is consistent with Kumbhakar and Sarkar (2003). The other factors highlighted by our analysis is that SIZE did not make any difference to the performance of banks during the GFC and nor did it contribute to any difference in the performances of local and foreign banks.

We previously found weak evidence that a high LDR reduces the profitability of banks in India but we do find exceptions when we examine the subsamples in Table 8.7. One exception is for foreign banks where there is a positive relationship between LDR and profitability which does not hold for local banks. This suggests that foreign banks in India more effectively manage their loan portfolios, with an increase in loans leading to an increase in profitability. The other exception is that during the non-GFC period, LDR had a negative association with bank profitability which was significantly different to the insignificant impact that it had during the GFC. During the non-GFC period, Indian banks had a higher LDR (68.71%) than

they had during the GFC period (66.13%), which may have resulted in a negative relationship between LDR and the profitability of banks.

Finally, we have the OFFBS that has previously been found to explain none of the variability in bank profits. Now we find some big differences between our subsamples. One finding is that OFFBS had a negative impact on the profitability of Indian banks during the GFC, whereas this relationship was positive during the non-GFC years. Off-balance sheet items include contingent items such as guarantees, derivatives and commitments. It appears that off-balance sheet activities became unprofitable during the GFC due to their associated bank-specific and foreign exchange risks. Furthermore, the overall impact of off-balance sheets on bank profitability in India was worse than it was in case of China, as banks in India increased their off-balance sheet exposure (as a percentage of total assets) from 21.24% (in the non-GFC period) to 24.23% (in the GFC period).

Similarly, we find that OFFBS had a negative impact on the profitability of local banks but a positive impact on the performance of foreign banks. Our results for foreign banks are consistent with findings of Singh (2010) who suggests the OFFBS has a positive effect on the profitability of foreign banks. The previous finding that OFFBS had no association with bank profitability also applies for both state-owned and private banks in India.

Table 8.7: Effect of bank-specific variables on ROA across different periods and categories of banks

Subsamples	NPLR	CAR	SIZE	LDR	OFFBS	COST
Local banks (X_{it})	-0.0679***	0.0602***	0.163***	-0.00433	-0.00696**	-0.0499***
Difference ($D.X_{it}$)	0.0595**	0.0103	0.209	0.0183***	0.00975	-0.0400***
Foreign banks	-0.008***	0.070***	0.372***	0.014**	0.003**	-0.089***
During GFC (X_{it})	-0.0516*	0.0523***	0.0946	0.0102	-0.0150***	-0.0618***
Difference ($D.X_{it}$)	-0.00389	0.00964	0.0537	-0.0145**	0.0159***	0.00270
Non-GFC Period	-0.055***	0.062***	0.148	-0.004*	0.0009**	-0.059***
State-owned (X_{it})	-0.0502***	0.0761***	-0.459**	-0.00625	-0.00158	-0.0431***
Difference ($D.X_{it}$)	-0.00453	-0.0333	0.503***	0.0108	0.000704	-0.0328***
Private banks	-0.054***	0.043***	0.044**	0.004	-0.0008	-0.0759***

Notes: The table reports the results for regression Equation 8.2. Our dependent variable is return on assets which is defined as profit before tax as a percentage of total assets of the bank. * Significant at 10% level, **Significant at 5% level, ***Significant at 1% level. $D.X_{it}$ is used to examine the effect of bank-specific variables across different bank categories. D will take the value of zero if the bank is local, if the year is 2008 or 2009 (GFC period) or if the bank is state-owned. D will take a value of 1 if the bank is foreign, if the period is the non-GFC period (i.e., 2004–2007 and 2010–2014) or if the bank is private.

China (Table 8.8)

Table 8.8 highlights how the impacts of bank-specific variables vary for local and foreign banks, during the GFC and non-GFC periods, for state-owned and privately owned banks in China. The results for the Chinese banks are more homogenous than they are for Indian banks, with the sign across almost all of the subsamples being the same as for the whole sample. A consistent finding in our previous analysis is that there is a negative relationship between SIZE and profitability. This finding continues to hold for all subsamples except state-owned banks, where our findings suggest that there is no relationship between SIZE and profitability.

Two other variables for which we consistently find a negative relationship are NPLR and COST and this remains the case across almost all subsamples. The only exception is that for the NPLR for state-owned banks, the relationship is insignificant, in contrast to it being strongly negative for private banks. NPLR had a much larger negative impact on the profits of Chinese banks during the GFC than it did during the non-GFC period. There are no exceptions in the impact of COST on profitability, with it being clearly negative for all subsamples. The extent of this negative impact is similar for local and foreign banks, and for state-owned and private banks, but it was much larger during the non-GFC period than during the

GFC years. It appears that banks focused on cost efficiencies when profits were threatened during the GFC.

Two variables which were previously found to have a negative impact on the profits of Chinese banks are the CAR and LDR and this again was largely maintained for our subsamples. The only exception is for state-owned banks where neither CAR nor LDR has a significant impact on profitability. Indeed, it seems that the profitability of state-owned banks is immune to almost all of our bank-specific variables, with COST being the only variable which has a significant (negative) coefficient. Finally, we have previously found that OFFBS has no impact on bank profitability in China and this finding holds for all subsamples.

Table 8.8: Effect of bank-specific variables on ROA across different type of bank categories

Subsamples	NPLR	CAR	SIZE	LDR	OFFBS	COST
Local banks (Xit)	-0.0513***	0.0142***	-0.0842***	0.00412***	0.000815	-0.0312***
Difference (D.Xit)	-0.0216	-0.00634	0.0222	-0.00204	-0.00187	0.000648
Foreign banks	-0.073***	0.007***	-0.062***	0.002***	-0.001	-0.03***
During GFC (Xit)	-0.0978***	0.00965***	-0.104***	0.00351*	-0.00190	-0.0274***
Difference (D.Xit)	0.0519***	0.000895	0.0267	-0.000731	0.00299	-0.00537**
Non-GFC period	-0.046***	0.010***	-0.077***	0.003*	0.0011	-0.033***
State-owned (Xit)	-0.0168	0.0189	-0.00640	0.000240	-0.00710	-0.0322***
Difference (D.Xit)	-0.0408*	-0.00878	-0.0850	0.00331	0.00791	0.000457
Private banks	-0.057***	0.010***	-0.091***	0.004***	0.0008	-0.032***

Notes: The table reports the result for the regression Equation 8.2. Our dependent variable is return on assets which is defined as profit before tax as a percentage of total assets of the bank. * Significant at 10% level, **Significant at 5% level, ***Significant at 1% level. Interaction variables are used to examine the effects of bank-specific variables across different bank categories. D will take the value of zero if the bank is local, if the year is 2008 or 2009 (GFC period) or if the bank is state-owned. D will take a value of 1 if the bank is foreign, if the period is the non-GFC period (i.e., 2004–2007 and 2010–2014) or if the bank is private.

8.4 Conclusion

This study investigates the effect of bank-specific, industry-specific and macroeconomic variables on the profitability of commercial banks in the two largest emerging economies in the Asia-Pacific region. Our sample comprises 217 commercial banks in India and China over the period 2004–2014.

Our findings with respect to bank-specific variables for India and China show a negative impact of NPLR on profitability, suggesting that banks with more conservative lending policies achieve superior performance in both countries. Similarly, our results suggest that the banks that maintain a high CAR are considered safe and are able to attract low-cost deposits, which make them more profitable than banks with low capital. The importance of cost control is highlighted by the strong negative relationship between COST and bank profits. These findings are largely consistent with those of other studies, although they do resolve some uncertainty with respect to whether a bank would benefit from pursuing a conservative or aggressive lending policy.

There is some variation in the findings for the bank-specific variables at the level of individual countries. The most notable variations are for SIZE which has an expected positive impact on bank profitability in India, but a somewhat surprising negative impact in China. However, the China finding is consistent with the findings of Chen et al. (2013) who put it down to the managers of the smaller banks being better placed to concentrate on the more profitable opportunities.

The industry-specific and macroeconomic variables have a slightly smaller impact than the bank-specific variables. In each country, there are state-owned and private banks. We find that the private banks in India perform better than state-owned banks, but the relationship between ownership and bank profitability is insignificant in China. We observe a negative impact of FININC on the profits of Indian and Chinese banks. The only macroeconomic variable that has an impact in both countries is INF, with the impact in China being positive as expected, whereas it is negative in India. Higher interest rates lead to greater profits for banks in China but contrary to our expectations, higher economic growth has a negative impact on bank profits.

Other questions of interest include whether the explanatory variables impact differently on Indian and Chinese banks, local and foreign banks, banks during the GFC and non-GFC periods and between the state-owned and private banks. The answers to these questions will assist in determining whether these banks need to be treated differently, especially by regulators. Our results highlight that the impact of some of the bank-specific variables varies across India and China, different bank categories and different periods (GFC and non-GFC). For example, we find that large banks are more profitable in India, but bank size has a negative effect on the profitability of banks in China. Similarly, bank size has a positive impact on the profitability of private banks in Indian but the impact of bank size is negatively correlated with the profitability of state-owned banks in India. We also find that high levels of liquidity led to an increase in the profitability of Indian banks during the GFC but liquidity did not have any impact of bank profitability during the non-GFC period.

When comparing the results for India with our aggregate results in Chapter 6 (Table 6.4), we find that the impact of some of the variables on the profitability of Indian banks is different from their impacts in our sample for all ten countries in the Asia-Pacific. For example, loan to deposit ratio had a positive impact on the profitability of banks in the ten countries as a whole, but the impact on the profitability of Indian banks is insignificant. Similarly, in our aggregate results, we find a positive relationship between cash reserve requirements and bank profitability, but cash reserve requirement does not have any impact on the profitability of Indian banks. In the case of China, the impacts of all the bank-specific and industry-specific variables on bank profitability are largely the same as those reported in our aggregate results for the ten countries combined. However, the impact of two macroeconomic variables is different. First, we do not find any impact of inflation

on the profitability of the ten countries combined, but inflation has a negative impact on the profitability of banks in China. Second, GDP growth has no impact on the profitability of banks in the ten countries combined but in the case of China, the relationship between bank profitability and GDP growth is negative.

Overall our results provide evidence of the impact of bank-specific, industry-specific and macroeconomic variables on the profitability of Indian and Chinese banks. We also find that the impacts of some of variables on bank profitability vary across countries and types of economies. The insights provided in this chapter will assist central banks and governments in India and China in making important decisions pertaining to monetary policy and bank regulations.

Chapter 9: Factors Influencing the Profitability of Banks in Four Developed Economies

This chapter investigates the effect of bank-specific, industry-specific and macroeconomic variables on the profitability of commercial banks in four developed economies in the period 2004–2014.

9.1 Introduction

In this chapter, we investigate the determinants of the profitability of commercial banks in our four developed economies over the period 2004–2014. The Japanese banking sector is the largest, with total assets of US$8.9 trillion. Financial inclusion in Japan (34 branches per 100,000 adults) and Australia (30 branches per 100,000 adults) is higher than in Hong Kong (23 branches per 100,000 adults) and Singapore (9.5 branches per 100,000). Similarly, number of ATMs per 100,000 in Australia (168) and Japan (128) are higher than Singapore (58) and Hong Kong (60). The population density is one of the reasons for less branches and less ATMs in Singapore and Hong Kong. The bank assets to GDP ratio is the highest in Australia (267%) and the lowest in Japan (185%). In addition to investigating the determinants of the profitability of banks, this chapter also identifies the differences between the determinants of profitability in Japanese banks and banks in the other three countries, and during the Global Financial Crisis (GFC) and non-GFC periods.

Our results suggest that credit quality, capital adequacy, bank size, bank liquidity and cost management are the key factors affecting the profitability of banks in developed economies. Large banks, banks with high non-performing loans and highly liquid banks are less profitable. Furthermore, banks that maintain high capital ratios are more profitable than banks with low capital ratios. Our results suggest that increases in the stringency of cash reserve requirements reduce the profitability of banks, while more financial inclusion leads to increased profitability.

Our findings confirm that banks are more profitable during high interest periods and high inflationary periods. We find evidence that banks in Japan are less profitable than banks in Australia, Hong Kong and Singapore.

9.2 Data and Methods

Our sample period runs from 2004 to 2014 and we can see in from Table 9.1, our dataset comprises 1,777 bank-year observations from 227 banks in four developed economies.[48]

Table 9.1: Number of banks and observations by country

Country	Number of banks	Observations
Australia	29	224
Hong Kong	35	298
Japan	138	1,132
Singapore	21	123
Total	**223**	**1,777**

9.2.1 Method

We use ordinary least squares (OLS) incorporating random effects to investigate the impact of bank-specific, industry-specific and macroeconomic variables using the following equation[49]:

$$\pi_{it} = \alpha + \sum_{j=1}^{J} \beta_j X_{it}^{j} + \sum_{l=1}^{L} \beta_l X_{it}^{l} + \sum_{m=1}^{M} \beta_m X_{it}^{m} + \sum_{n=1}^{N} \beta_n X_{i}^{n} + \sum_{p=1}^{P} \beta_p X_{i}^{p} + \in_{it} \quad (9.1)$$

where π_{it} refers to a measure of the profitability of bank i at time t with i=1, … N and t=1, … T, α is a constant term, X_{it}^{j} indicates bank-specific explanatory variables, X_{it}^{l} refers to industry-specific variables, X_{it}^{m} indicates macroeconomic variables, X_{i}^{n} refers to a dummy variable for GFC and X_{i}^{p} refers to dummy variables for countries.

[48] Please refer to Section 4.2 in Chapter 4 for sources of data and data treatment techniques.
[49] Please refer to Section 4.3.3 in Chapter 4 for more explanation on method.

In all the cases, we will run regressions on bank-specific variables first; next we will add industry-specific variables; and finally we will add macroeconomic variables to identify the differences across the estimated results, and to check the extent to which the explanatory power of the model increases with the addition of industry-specific and macroeconomic variables.

We also investigate how the effect of bank-specific variables on bank profitability varies across Japanese banks and banks of the other three countries and across two periods (GFC and non-GFC) using the following equation[50]:

$$\pi_{it} = \alpha + \sum_j^J \beta_1 X_{it}^j + \sum_{j=1}^J \beta_2 \mathrm{D}_1 X_{it}^J + \sum_{l=1}^L \beta_l X_{it}^l + \sum_{m=1}^M \beta_m X_{it}^m + \in_{it} \quad (9.2)$$

where X_{it}^j refers to bank-specific explanatory variables, X_{it}^l refers to industry-specific variables and X_{it}^m refers to macroeconomic variables.

9.2.2 Dependent and Explanatory Variables

Table 9.2 provides a summary of the dependent and independent variables. It includes notations, measurements and expected effects.[51] We have used two profitability measures, return on assets (ROA) and return on deposits (ROD). ROA is our key measure while we have used ROD to increase the robustness of the results. . The expected impact of explanatory variables is based on the findings in the literature and on intuition.

[50] Please refer to Section 4.3.4 in Chapter 4 for details on methods.
[51] Please refer to Section 2.4 in Chapter 2 and Section 4.4 in Chapter 4 for more explanation on variables.

Table 9.2: Definition of variables, notation and expected effect

Variables	Notation	Measure	Expected Sign
Dependent Variable			
Return on assets	ROA	Profit before tax/Total Assets (%)	
Return on deposits	ROD	Profit before tax/Total Deposits (%)	
Independent Variables			
Bank-specific Determinants			
Non-performing loan ratio	NPLR	Non-performing Loans/Total Loans (%)	-
Capital adequacy ratio	CAR	Tier 1 Capital + Tier 2 Capital / Risk-Weighted Assets (%)	+/-
Total assets (bank size)	SIZE	Natural log of total assets of bank	+
Loans to deposit ratio	LDR	Total Loans / Total Deposits (%)	+/-
Off-balance sheet activities ratio	OFFBS	Off-balance sheets Items/Total Assets (%)	+/-
Cost to income ratio	COST	Operating Cost / Total Income (%)	-
Industry-specific Determinants			
Cash reserve requirement	CRR	Yearly percentage of deposits maintained by banks (%)	+/-
Financial inclusion	FININC	Number of branches/100,000 adults	+/-
Macroeconomic Determinants			
Inflation	INF	Yearly percentage change in CPI (%)	+
Interest rate	INT	Discount rate of last quarter of calendar year (%)	+
Gross domestic product	GDP	Yearly GDP growth rate (%)	+

Notes: The "+" sign shows that we expect a positive relationship between dependent variable and independent variable. The "-" sign shows that we expect a negative relationship between dependent variable and independent variable. The "+/-" sign shows that we are uncertain about the relationship between dependent and independent variables.

Table 9.3 reports the descriptive statistics of the dependent and independent variables for the banks. The table reports separate results for each country as well as the combined results for all four countries.

The results show that there are large differences between the descriptive statistics of the countries for some of the variables. Both profitability measures, return on assets (ROA) and return on deposits (ROD), show that banks in Hong Kong and Singapore are the most profitable, followed by Australia and Japan.

The non-performing loan ratio (NPLR) of Japanese banks (4.22%) is the highest while banks in Australia (0.89%) have the lowest NPLR. This suggests that the quality of the loan portfolios of Australian banks is better than other three countries. The results show that banks in Hong Kong and Singapore maintain high capital ratios. The capital adequacy ratios (CAR) of banks in Hong Kong and Singapore are 23.43% and 21.56%, respectively, which is higher than the average CAR of

Australian banks (15.17%) and Japanese banks (11.77%). The loan to deposit ratio (LDR) of Australian banks (96.67%) is the highest while the LDR of banks in Hong Kong (58.94%) is the lowest. The higher LDR of Australian banks suggests that they are following more aggressive lending strategies. The average off-balance sheet ratios (OFFBS) for banks in Hong Kong and Singapore are higher than for banks in Australia and Japan. In terms of cost, Japanese banks appear to be at a disadvantage with the highest cost to income ratio (67.66%).

The results of financial inclusion (FININC) analysis indicate that there are 34.02 branches per 100,000 people in Japan compared to 30.75 branches per 100,000 people in Australia, 23.41 branches per 100,000 people in Hong Kong, and 10.48 branches per 100,000 people in Singapore.

In terms of macroeconomic indicators, the average inflation over the 11 years shows that Japan has the lowest level of inflation (0.29%). There is little difference between the inflation rates of the other three countries. On the other hand, the interest rate (1.09%) in Singapore is lower than the interest rates in Hong Kong (2.18%), Australia (4.55%) and Japan (4.59%). GDP growth in Japan is lowest (0.85%) and highest in Singapore (5.44%).

Table 9.3: Descriptive statistics of variables over the period 2004–2014

Variable	All Countries (Obs. 1,777)		Australia (Obs. 224)		Japan (Obs. 1,132)		Hong Kong (Obs. 298)		Singapore (Obs. 123)	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Bank profitability										
Return on Assets (%)	0.65	0.72	0.98	0.69	0.36	0.47	1.30	0.83	1.20	0.85
Return on deposits (%)	0.92	1.35	1.43	1.25	0.43	0.74	1.89	1.77	2.14	2.09
Bank-specific variables										
Non-performing loan ratio (%)	3.07	2.35	0.89	1.15	4.22	2.06	0.95	1.13	1.60	1.18
Capital adequacy ratio (%)	14.83	8.83	15.17	6.61	11.77	5.85	23.43	12.41	21.56	6.98
Total assets (bank size)	4.25	0.80	4.07	1.00	4.43	0.58	3.86	0.99	3.78	1.07
Loan to deposit ratio (%)	70.86	21.02	96.67	23.08	69.27	13.27	58.94	23.81	67.33	29.00
Off-bal. sheet activities (%)	9.09	19.13	4.91	8.79	1.79	6.79	34.24	28.68	23.00	22.18
Cost to income ratio (%)	62.19	16.04	58.11	17.04	67.66	10.92	48.38	17.80	52.70	21.71
Industry-specific variables										
Cash reserve requirement (%)	1.24	1.49	4.55	1.22	0.71	0.00	0.00	0.00	3.00	0.00
Financial Inclusion (%)	30.20	6.64	30.75	0.68	34.02	0.25	23.41	0.38	10.48	0.57
Macroeconomic variables										
Inflation (%)	1.15	1.65	2.72	0.73	0.29	1.01	2.66	1.76	2.47	1.73
Interest rate (%)	3.94	1.90	4.55	1.22	4.59	1.25	2.18	2.33	1.09	1.31
GDP growth (%)	2.02	2.88	2.95	0.74	0.85	2.20	4.38	3.19	5.44	3.17
Dummies										
During GFC	0.19	0.39	0.28	0.45	0.17	0.38	0.19	0.39	0.19	0.39

Notes: These variables are selected from a number of available variables. We measured correlation between explanatory variables. The results suggest that there is no multicollinearity issue.[52]

9.3 Empirical Results

9.3.1 Regression Results and Discussion

Table 9.4 reports aggregate regression results obtained by pooling the results for the data for the four countries. These results are obtained through a regression as set out in Equation 9.1.

Panel A reports the results for the profitability measure ROA and Panel B reports the results for the profitability measure ROD. Column 1 and Column 4 show the results with the bank-specific explanatory variables only, to which we next add the industry-specific variables (Column 2 and Column 5) and we then further add the macroeconomic variables (Column 3 and Column 6). Overall, the results show that the explanatory power of the model slightly increases when we add industry-specific and macroeconomic variables. In the case of ROA, the adjusted r-squared

[52] Please refer to Appendix 2 (Table A-16).

for the model with all variables included is 51.41%, and in the case of ROD, the adjusted r-squared for the model with all variables included is 47.32%.

Our findings suggest that all the bank-specific variables have a significant impact on the profitability of banks. There is strong evidence of a negative impact of NPLR, SIZE and COST on the profitability of banks. The negative impact of NPLR and COST is inconsistent with our expectations but we expected a positive relationship between SIZE and the profitability of banks. It appears that economies of scale do not help large banks increase their profitability. The findings associated with a negative relationship between SIZE and the profitability of banks are consistent with Tan and Floros (2012a), Tan (2016) and Berger et al. (2005). All the studies suggest that small banks are more profitable than large banks. We were uncertain about the expected effect of CAR and LDR on the profitability of banks. In both the cases, our results suggest that these variables have a positive and statistically significant impact on the profitability of banks. Our results for CAR are consistent with Sufian and Habibullah (2009) and García-Herrero et al. (2009) who suggest that well-capitalised banks are less likely to default, which suggests that they can attract low-cost funding, enabling them to improve profitability. Further, Chien-Chiang Lee Hsieh (2013) also suggest high level of capital reduces risk and increase profitability. Similarly, there are studies that have found a positive relationship between LDR and the profitability of banks. Tan and Floros (2012b) suggest that the low liquidity of banks indicates that the banks have lent out large amounts and that this has generated high levels of profitability.

Our findings suggest that the performance of banks was negatively affected by the Global Financial Crisis in 2008–2009 which is line with our aggregate results for all ten countries in Chapter 6. Furthermore, our results indicate that banks in Australia, Hong Kong and Singapore are more profitable than banks in Japan. This

result gains some support from the results of descriptive statistics (Table 9.2) which indicated that Japanese banks have the lowest ROA and ROD.

In terms of industry-specific variables, our results suggest that cash reserve requirement (CRR) has a negative impact on the profitability of banks. One possible explanation is that an increase in lending by a bank leads to higher profits, as reflected by the positive relationship between LDR and profitability; CRR restricts the lending activity of banks, and therefore an increase in CRR reduces the profitability of banks. Given FININC has not been used in any other studies, we were unable to predict the direction of the relationship between FININC and bank profitability. We find strong evidence to suggest that the impact is positive. This is in contrast with our findings for other types of economies and other countries, which indicate a negative impact of FININC on the profitability of banks. There are three possible explanations. First, these are high income economies and expanding financial services may not necessarily increase default rates, as banks will be dealing with wealthier clients and can offer them profitable banking products. This gains some support from the positive relationship between LDR and profitability. Second, financial inclusion allows banks to extend their services to large pool of customers which will increase their deposits and loans. Increase in deposits and loans has a potential to increase in the profitability of banks. Third, financial inclusion allows banks to achieve diversification which helps them to reduce risk (Boot and Schmeits, 2000).

Of the macroeconomic variables, INF has a strong positive impact on bank profitability which is in line with our expectations. In general, banks increase their lending rates during inflationary periods, which leads to higher profitability. Perry (1992) suggests that if banks are able to predict inflation, they adjust their interest rates accordingly which results in high profitability during inflationary periods. As

expected, INT has a positive impact on the profitability of banks. Our results show that the coefficient of GDP is statistically insignificant.

The results associated with the other profitability measure ROD are reported in Column 4, Column 5 and Column 6. The results are consistent with ROA for ten out of eleven variables. We find a variance for only one variable (interest rate) which has a positive impact on the ROA but does not have any impact on ROD.

Table 9.4: Regression results

Variables	Panel A			Panel B		
	(1)	(2)	(3)	(4)	(5)	(6)
Bank-specific variables						
Non-performing loan ratio	-0.0717***	-0.0806***	-0.0797***	-0.106***	-0.124***	-0.121***
	(-10.21)	(-10.95)	(-10.77)	(-8.25)	(-9.21)	(-8.91)
Capital adequacy ratio	0.00941***	0.0110***	0.0127***	0.0445***	0.0478***	0.0493***
	(3.56)	(4.15)	(4.79)	(8.88)	(9.52)	(9.70)
Log (size)	-0.269***	-0.239***	-0.200***	-0.582***	-0.524***	-0.481***
	(-7.90)	(-6.97)	(-5.75)	(-8.52)	(-7.57)	(-6.84)
Loan to deposit ratio	0.00209**	0.00231**	0.00283***	0.0102***	0.0106***	0.0113***
	(2.12)	(2.36)	(2.90)	(5.50)	(5.72)	(6.10)
Off-balance sheet activities	0.00283***	0.00318***	0.00286***	0.00536***	0.00605***	0.00573***
	(3.08)	(3.47)	(3.13)	(3.16)	(3.59)	(3.39)
Cost to income ratio	-0.0252***	-0.0248***	-0.0237***	-0.0391***	-0.0384***	-0.0374***
	(-23.32)	(-23.10)	(-21.34)	(-19.52)	(-19.28)	(-18.11)
Dummies						
During GFC	-0.152***	-0.153***	-0.163***	-0.141***	-0.141***	-0.180***
	(-6.27)	(-6.36)	(-5.22)	(-3.23)	(-3.24)	(-3.17)
Australia	0.00347	0.641***	0.662***	-0.246	0.838***	0.910***
	(0.03)	(4.17)	(4.22)	(-1.16)	(2.80)	(2.99)
Hong Kong	-0.125	1.118***	1.333***	-0.558***	1.870***	2.231***
	(-1.20)	(3.65)	(4.17)	(-2.59)	(3.30)	(3.76)
Singapore	-0.0174	3.049***	3.488***	0.184	6.030***	6.788***
	(-0.14)	(4.61)	(5.08)	(0.69)	(4.98)	(5.38)
Industry-specific variables						
Cash reserve requirement		-0.0660***	-0.0662***		-0.0882**	-0.0893**
		(-2.89)	(-2.91)		(-2.13)	(-2.15)
Financial inclusion		0.125***	0.140***		0.241***	0.270***
		(4.44)	(4.82)		(4.73)	(5.10)
Macroeconomic variables						
Inflation			0.0247***			0.0302**
			(3.04)			(2.04)
Interest rate			0.0184***			0.0104
			(2.59)			(0.80)
GDP growth			-0.00649			-0.0130
			(-1.24)			(-1.36)
Constant	3.317***	-1.023	-1.934*	4.860***	-3.571**	-4.918***
	(15.44)	(-1.03)	(-1.89)	(11.75)	(-1.97)	(-2.62)
Number of observations	1,777	1,777	1,777	1,777	1,777	1,777
Number of years (2004–2014)	11	11	11	11	11	11
Adjusted R-squared	49.35%	50.57%	51.54%	45.60%	46.88%	47.32%

Notes: Our dependent variables are return on assets and return on deposits. Return on assets is defined as profit before tax as a percentage of total assets of the bank and return on deposits is defined as profit before tax as a percentage of total deposits of the bank. Column (1) and Column (4) show the estimated results for bank-specific variables, Column (2) and Column (5) show results for bank-specific and industry-specific variables and Column (3) and Column (6) show the results for bank-specific, industry-specific and macroeconomic variables. *t*-Values are in parenthesis. * Significant at 10% level, **Significant at 5% level, ***Significant at 1% level.

We use ROD as another profitability measure to ensure robustness of the results. As reflected in Table 9.4, the results for the profitability measure ROD are largely consistent with those for ROA. Therefore, we only report on ROA in the subsequent analysis.

9.3.2 Effect of Bank-Specific Variables across Two Subsamples (Table 9.5)

In this section, we analyse the data by splitting the sample in two different ways. First, we split the sample into banks in Japan and banks in the other three countries because Japan has the largest banking sector and we want to see the extent to which it is driving the results. Second, we split the sample into two periods (the GFC period and the non-GFC period) to get more insight into the impact of variables on the profitability of banks across the two periods. The analysis is conducted using the regression set out in Equation 9.2.

Four variables have the same impact on the profitability of banks across both subsamples and are consistent with the results we reported for the pooled data: NPLR, CAR, SIZE and COST. NPLR, SIZE and COST have a negative impact on bank profits across both categories, while CAR has a positive impact on bank profitability across both subsamples.

When we compare the impact of bank-specific variables on Japanese banks with their impact on banks in the other three countries, we note that NPLR has same negative impact on profits but the coefficient is larger for the other three countries. This shows that a 1% increase in NPLR reduces the profitability of banks in the other three countries by 0.13% while in Japan, a 1% increase in NPLR reduces profitability by 0.05%. The other two variables which have different impact on the profitability of Japanese banks and the other three countries are LDR and OFFBS. Our aggregate results (see Table 9.4) suggest a positive impact of LDR on the

profitability of banks in the four developed economies combined. However, after splitting up the sample, the effect on the profitability of Japanese banks becomes insignificant. It appears that the level of liquidity does not explain the profitability of Japanese banks. Similarly, we also find a positive impact of OFFBS on profitability in our aggregate results for the four countries combined (Refer Table 9.4). After splitting the sample, our results suggest a positive impact of OFFBS on the profitability of banks in the other three countries but it does not have any impact on the profitability of Japanese banks. OFFBS includes the contingent items which help banks to increase non-interest income. It appears that banks in other three countries are focusing on off-balance activities to generate non-interest income.

Turning to our second subsample, we find that only one variable (LDR) has a different impact in the profitability of banks across the two periods. LDR has a positive impact on profitability during non-GFC period while the effect is insignificant during the GFC period. This is not surprising as during non-GFC period banks extended more loans, which translated into profitability.

Table 9.5: Effect of bank-specific variables on ROA across two subsamples

Japan vs. Other Countries	**NPLR**	**CAR**	**SIZE**	**LDR**	**OFFBS**	**COST**
Japan (Xit)	-0.0555***	0.0138**	-0.273***	0.000579	-0.00400	-0.0207***
Difference (D.Xit)	-0.0730***	-0.0017	0.0574	0.00239	0.00720**	-0.00482**
Other countries	-0.1285***	0.01208***	-0.2156***	0.002969**	0.0032***	-0.02552***
GFC vs. Non-GFC Period	**NPLR**	**CAR**	**SIZE**	**LDR**	**OFFBS**	**COST**
GFC period (Xit)	-0.0853***	0.0118***	-0.297***	0.00141	0.00453***	-0.0247***
Difference (D.Xit)	0.0136	-0.00286	0.0320	0.00121	-0.00165	-0.000901
Non-GFC period	-0.0717***	0.00894***	-0.265***	0.00262**	0.00288***	-0.025601***

Notes: The table reports the results for the regression Equation 9.2. Our dependent variable is return on assets which is defined as profit before tax as a percentage of total equity of the bank. * Significant at 10% level, **Significant at 5% level, ***Significant at 1% level. Interaction variables are used to examine the effect of bank-specific variables across different bank categories. D will take the value of zero if the bank is from developed market, if the bank is Japanese or if the year is 2008 or 2009 (GFC period). D will take a value of 1 if the bank is from developed market, if the bank is from a country other than Japan or if the period is the non-GFC period (i.e., 2004–2007 and 2010–2014).

9.4 Conclusion

This chapter focuses on the profitability of banks in four developed countries. The analysis is based on a sample of 227 commercial banks in Australia, Hong Kong, Singapore and Japan over the period from 2004 to 2014.

Our pooled findings with respect to the bank-specific variables suggest that banks which maintain tight control over both credit and costs will be the most profitable. We find a negative relationship between non-performing loans and profits, which suggests that banks with more conservative lending policy achieve superior performance. The importance of cost control is highlighted by the strong negative relationship between the cost to income ratio and bank profits. Our results suggest that bank size has a negative impact on the profitability of banks. Overall, our findings are largely consistent with those of other studies although they do resolve some uncertainty with respect to whether a bank would benefit from pursuing a conservative or aggressive lending policy.

Most of our results in earlier chapters on individual countries or types of economies suggest a negative relationship between financial inclusion and the profitability of banks. However, we find that more financial inclusion increases the profitability of banks in developed economies. Australia, Hong Kong, Japan and Singapore are high income countries and banks have low non-performing loans compared to other countries in the study. Hence, expanding financial services do not necessarily increase default rates, as banks will be dealing with wealthier clients and can offer them profitable banking products. In line with our expectations and other studies, our results suggest that banks in developed economies perform better during high interest periods and high inflationary periods.

Our results suggest that the impacts of two variables (LDR and OFFBS) on the profitability of banks vary across Japanese banks and banks in the other three countries. LDR has a positive impact on the profitability of banks in the other three countries but it has an insignificant effect on the profitability of Japanese banks, indicating that the liquidity of banks does not explain the profitability of Japanese banks. Similarly, OFFBS has a positive impact on bank profitability in three countries but it does not have any impact on the profitability of Japanese banks, indicating that banks in the other three countries focus on off-balance activities to generate non-interest income, which increases their overall profitability. We also find differing impacts of LDR across two periods (the GFC and non-GFC periods). LDR had a positive impact on the profitability of banks during non-GFC period but it did not affect bank profits during the GFC period. This is not surprising as during the non-GFC period banks extended more loans, which translated into increased profitability.

When comparing the results for developed economies with our aggregate results for all ten countries in Chapter 6 (Table 6.4), we find that the impacts of some of the variables on bank profitability are different. For example, we report a positive impact of CRR on profitability in our aggregate results, but we find a negative impact of CRR on the profitability of banks in developed economies. One possible explanation is that CRR restricts the lending ability of banks, which results in a decrease in their profitability. Similarly, we report a negative relationship between FININC and bank profitability in the ten countries combined, but our results for developed economies suggest a positive relationship. This may be because banks in these high-income countries are dealing with wealthy clients and are able to offer them profitable banking products. For the macroeconomic variables, we do not find a significant relationship between inflation and bank profitability in the ten

countries combined, but we find a positive correlation between inflation and bank profitability in developed markets. These findings will assist policy makers to make important decisions pertaining to monetary policy, economic policy and bank regulations.

Chapter 10: Conclusion

10.1 Introduction

This thesis has five empirical chapters that focus on the research questions. The first empirical chapter investigates whether or not a profitable banking sector makes a positive contribution to economic growth across ten countries in the Asia-Pacific region. The second empirical chapter investigates the determinants of the profitability of banks in the same ten countries in the Asia-Pacific region. The third empirical chapter investigates the determinants of the profitability of conventional and Islamic banks in four small emerging markets –Bangladesh, Indonesia, Malaysia and Pakistan. The fourth empirical chapter investigates the determinants of the profitability of Indian and Chinese banks. The fifth empirical chapter investigates the determinants of the profitability of banks in four developed economies; Australia, Hong Kong, Japan and Singapore.

We use annual data for banks from ten countries that covers the period from 2004 to 2014 to address the research questions. The study is based on secondary data obtained from different sources. We use various econometric methods in each of the empirical chapters to answer the research questions.

10.2 Key findings from Empirical Chapters

Our results from Chapter 5 suggest that a profitable banking sector is a prerequisite for economic growth in the Asia-Pacific region. Perhaps surprisingly, we find that bank size is negatively correlated with GDP growth, with the influence of bank profitability on economic growth decreasing when the size of banking sector increases. In the causality test, we find that causality runs from bank profitability to economic growth, but we also find some delayed impact of economic growth on bank profitability.

Chapter 6 focuses on the determinants of the profitability of banks in the aggregate of our ten Asia-Pacific countries. We find that cost-efficiency and credit quality are important factors behind the profitability of banks. Our results indicate that a high level of capital helps banks to increase profitability. In contrast to our expectations, we find a negative impact of bank size on the profitability of banks. The result is line with Tan (2016) who suggests that if a bank is small this helps its managers to focus on profitable segments to improve profit margins. We find that loan to deposit ratio (LDR) has a differing impact on the profitability of banks across regions. LDR has a positive impact on bank profitability in small emerging and developed economies but a negative impact on bank profitability in large emerging economies. It appears that aggressive lending by the banks in large emerging economies has a negative effect on the quality of their loan portfolios which leads to decreased profitability.

Chapter 7 focuses on the factors influencing the profitability of conventional and Islamic banks in four small emerging economies. The results suggest that credit quality, cost management and bank size are the major contributors to bank profitability for both Islamic and conventional banks. We find strong evidence to suggest that Islamic banks are less profitable than conventional banks. One possible reason for this result is the low cost efficiency of Islamic banks which is reflected in their high cost to income ratio (60.26%) against the cost to income ratio (56.46%) of conventional banks. Further, we find that being large helps conventional banks to increase profitability but bank size does not influence the profitability of Islamic banks.

In Chapter 8, we investigate the determinants of the profitability of banks in India and China. Our findings from Chapter 8 suggest that credit quality, capital adequacy and cost management are the key factors behind the profitability of banks in India

and China. The impacts of some of the variables vary across India and China. Bank size has a positive impact on the profitability of banks in India but a negative impact on the profitability of banks in China. This indicates that large Indian banks are able to take advantage of economies of scale and that in China, small banks are more able to focus on the profitable segments of their businesses. We also find foreign banks in India are more profitable than local banks but foreign banks in China are less profitable than local banks. Heffernan and Fu (2010) suggest that the reason for the low profitability of foreign banks in China is strict regulation by the Chinese government.

In Chapter 9, we investigate the determinants of profitability in four developed economies. Our findings related to bank-specific variables are largely consistent with our findings for other types of economies and countries. For example, banks with prudent credit policies and tight control over costs are more profitable than their competitors. However, we have interesting findings associated with two industry-specific variables. In most of our types of economies and countries we either find a positive impact of cash reserve requirement (CRR) on bank profitability or an insignificant impact. Our results for developed economies suggest a negative impact of CRR on the profitability of banks. One possible explanation is CRR restricts the lending ability of banks which results in a decrease in the profitability of banks. In most of our results for other types of economies and countries, we find a negative impact of financial inclusion (FININC) on the profitability of banks, but our results for developed economies suggest a positive relationship between FININC and bank profitability. This may be because banks in these high income countries deal with wealthy clients and are able to offer them profitable banking products.

10.3 Policy Implications

Our research is broadly divided into two parts. In the first part, we investigate the extent to which bank profits affect economic growth in the Asia-Pacific region. Our findings suggest that a profitable banking system is an important contributor to economic development. Given the importance of a profitable banking system, in the second part of this thesis we examine what determines the profitability of banks in ten countries in the Asia-Pacific region.

In first part, we find that bank profitability fosters economic growth in the Asia-Pacific region. Therefore, this study will assist policy makers to make important decisions in relation to the structure of the banking sector. The research shows that the government and all regulators have to be aware of the impact that policies and regulations will have on bank profitability because of the possible knock-on impact it might have on the economy. Therefore, policy makers should consider the impact that a profitable banking sector makes to economic growth when they formulate economic policies and regulations for banking systems.

In the second part of the thesis, we investigate the determinants of profitability in the Asia-Pacific region. We find that, in addition to bank-specific variables, industry-specific and macroeconomic variables also influence the profitability of banks in the Asia-Pacific region. We find significant impact for capital adequacy ratios, cash reserve requirement, financial inclusion, inflation rates, interest rates and GDP growth on the profitability of banks. These findings will assist policy makers to make important decisions pertaining to monetary policy, economic policy and bank regulations.

10.4 Future Research

This thesis focuses on the relationship between the profitability of banks and economic growth and the determinants of bank profitability. In order to conduct the analysis, we use data from commercial banks over the period from 2004 to 2014. We do not consider other financial intermediaries and capital/bond markets. Future research could be done on the impact of non-banking institutions, investment companies, mutual funds, insurance companies, bond markets, stock markets and house-building finance corporations on economic growth. Our research focuses on ten countries in the Asia-Pacific region. Hence, there is a potential to extend this research to other regions and countries of the world. It would be useful to compare the results for different countries and types of economies, and to seek more clarification on whether or not a positive relationship exists between bank profitability and economic growth in other types of economies.

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Appendices

Appendix 1: Name of the banks

Table A-1: Banks in Australia

Name of bank
AMP Bank Limited
Australia and New Zealand Banking Group Limited
Bank of China (Australia) Ltd
Bank of Queensland Limited
Bank of Sydney Ltd
Bankmecu
Bendigo and Adelaide Bank Limited
BOQ Specialist (Aust) Limited
BOS International (Australia) Ltd
Citigroup Pty Limited
Commonwealth Bank of Australia
Community Cps Australia Limited-Beyond Bank Australia
Credit Agricole CIB Australia Limited
Cuscal Limited
Defence Bank
Hume Bank Limited
ING Bank (Australia) Limited
Medibank
Members Equity Bank Pty Ltd-Me Bank
National Australia Bank Limited
Pirie Street Holdings Pty Limited
QT Mutual Bank Limited
RBS Group (Australia) Pty Limited
Rural Bank Limited
Suncorp-Metway Ltd
Teachers Mutual Bank
The Police Department Employees' Credit Union Limited-Police Bank Ltd
Toronto Dominion Australia Ltd.
Westpac Banking Corporation

Table A-2: Banks in Bangladesh

Name of bank
AB Bank Ltd
Agrani Bank Limited
Al-Arafah Islami Bank Ltd.
Bangladesh Commerce Bank Ltd
Bank Asia Limited
BASIC Bank Ltd-Bangladesh Small Industries & Commerce Bank Ltd
BRAC Bank Limited
City Bank Ltd
Dhaka Bank Limited
Dutch-Bangla Bank Limited
Eastern Bank Limited
Export Import Bank of Bangladesh Limited
First Security Islami Bank Limited
Hongkong and Shanghai Banking Corporation LTD - Amanah Branch-Hsbc Amanah
Hongkong and Shanghai Banking Corporation Ltd - Bangladesh Branch-HSBC Bangladesh
Hongkong and Shanghai Banking Corporation Ltd - Offshore Banking Unit
ICB Islamic Bank Limited
IFIC Bank Limited-International Finance Investment and Commerce Bank Limited
Islami Bank Bangladesh Limited
Jamuna Bank Ltd
Janata Bank Limited
Meghna Bank Limited
Mercantile Bank Limited
Midland Bank Limited
Modhumoti Bank Limited
Mutual Trust Bank
National Bank Limited
National Credit and Commerce Bank Ltd
NRB Bank Limited
NRB Commercial Bank Limited
NRB Global Bank Limited
One Bank Limited
Premier Bank Ltd (The)
Prime Bank Limited
Pubali Bank Limited
Rupali Bank Limited
Shahjalal Islami Bank Ltd
Social Islami Bank Ltd
Sonali Bank Limited
South Bangla Agriculture & Commerce Bank Limited
Southeast Bank Limited
Standard Bank Limited
The Farmers Bank Limited

Table A-2 *(Continued)*
Trust Bank Ltd (The)
Union Bank Limited
United Commercial Bank Ltd
Uttara Bank Limited

Table A-3: Banks in China

Name of bank
Agricultural Bank of China Limited
Bangkok Bank (China) Co Ltd
Bank of Anshan Co Ltd
Bank of Beijing Co Ltd
Bank of Cangzhou Co Ltd
Bank of Changsha Co Ltd
Bank of Chengde
Bank of Chengdu Co Ltd
Bank of China Limited
Bank of Chongqing
Bank of Communications Co. Ltd
Bank of Dalian
Bank of Deyang
Bank of Dongguan
Bank of East Asia (China) Ltd
Bank of Fuxin Co. Ltd
Bank of Ganzhou Co Ltd
Bank of Guilin Co Ltd
Bank of Guiyang Co Ltd
Bank of Handan Co Ltd
Bank of Hangzhou Co Ltd
Bank of Hebei Co Ltd
Bank of Jiangsu Co Ltd
Bank of Jiaxing Co Ltd
Bank of Jilin Co Ltd
Bank of Jinhua Co Ltd
Bank of Jining Co Ltd
Bank of Jinzhou Co Ltd
Bank of Jiujiang Co Ltd
Bank of Kunlun Co Ltd
Bank Of Langfang Co.,Ltd
Bank of Lanzhou Co. Ltd
Bank of Liaoyang Co Ltd
Bank of Luoyang Co Ltd
Bank of Montreal (China) Co Ltd
Bank of Nanchang co., Ltd
Bank of Nanjing
Bank of Ningbo
Bank of Ningxia Co Ltd
Bank of Qingdao Co Ltd
Bank of Rizhao
Bank of Shanghai
Bank of Shaoxing Co Ltd
Bank of Suzhou Co Ltd
Bank of Taizhou Co Ltd

Table A-3 *(Continued)*

Bank of Tianjin
Bank of Tokyo Mitsubishi UFJ (China) Ltd
Bank of Weifang Co Ltd
Bank of Wenzhou Co Ltd
Bank of XI'an Co Ltd
Bank of Xinxiang Co Ltd
Bank of Yingkou
Bank of Zhengzhou Co Ltd
Bank Sinopac (China) Ltd
Baoshang Bank
Beijing Rural Commercial Bank Co Ltd
BNP Paribas (China)
Changshu Rural Commercial Bank
Chengdu Rural Commercial Bank Co Ltd
China Bohai Bank
China CITIC Bank
China CITIC Bank Corporation Limited
China Construction Bank Corporation Joint Stock Company
China Development Bank Corporation
China Everbright Bank Co Ltd
China Guangfa Bank Co Ltd
China Merchants Bank Co Ltd
China Minsheng Banking Corporation
China Resources Bank of Zhuhai Co Ltd
China Zheshang Bank Co Ltd
Chinese Mercantile Bank
Chongqing Liangping ANZ Rural Bank Company Limited
Chongqing Rural Commercial Bank
Chongqing Three Gorges Bank Co., Ltd
Citibank (China) Co Ltd
CITIC Bank International (china) Limited
Credit Agricole CIB (China)
Dah Sing Bank (China) Limited
DBS BANK (China) Limited
Deutsche Bank (China) Co Ltd
Dongguan Rural Commercial Bank Co Ltd
Dongying Bank Co Limited
East West Bank (China) Limited
Evergrowing Bank Co Ltd
Foshan Rural Commercial Bank
Fubon Bank (China) Co., Ltd
Fudian Bank Co Ltd
Fujian Haixia Bank Co Ltd
Guangdong Gaoming Rural Commercial Bank Co., Ltd
Guangdong Huaxing Bank Co Ltd
Guangdong Nanyue Bank Co Ltd
Guangdong Shunde Rural Commercial Bank Company Limited

Table A-3 *(Continued)*

Guangxi Beibu Gulf Bank Co Ltd
Guangzhou Rural Commercial Bank Co., Ltd.
Hana Bank (China) Company Ltd
Hang Seng Bank (China) Limited
Hankou Bank
Harbin Bank
HSBC Bank (China) Co Ltd
Hua Xia Bank co., Limited
Huarong Xiangjiang Bank Co. Ltd
Hubei Bank Corporation Limited
Huishang Bank Co Ltd
Industrial & Commercial Bank of China (The) - ICBC
Industrial Bank Co Ltd
Industrial Bank of Korea (China) Limited
Jiangmen Ronghe Rural Commercial Bank Co., Ltd
Jiangsu Haian Rural Commercial Bank Company Limited
Jiangsu Jiangnan Rural Commercial Bank Co Ltd
Jiangsu Jiangyin Rural Commercial Bank
Jiangsu Wujiang Rural Commercial Bank
Jiangsu Zhangjiagang Rural Commercial Bank Co. Ltd
Jiangsu Zijin Rural Commercial Bank
Jilin Jiutai Rural Commercial Bank Co Ltd
Jinshang Bank Co Ltd
JP Morgan Chase Bank (China) Co Ltd
KEB Bank (China) Co, Ltd.
Kookmin Bank (China) Co., Ltd.
Laishang Bank Co Ltd
Longjiang Bank Corporation Limited
Metropolitan Bank (China) Ltd
Mizuho Bank (China) Ltd
Morgan Stanley Bank International (China) Limited
Nanchong City Commercial Bank Co., Ltd
Nanhai Rural Commercial Bank
Nanyang Commercial Bank (China) Limited
Ningbo Commerce Bank Company Limited-Nc Bank
OCBC Bank (China) Limited
Panzhihua City Commercial Bank Co Ltd
Ping An Bank Co Ltd
Qilu Bank co ltd
Qingdao Rural Commercial Bank Co Ltd
Qishang Bank.
Royal Bank of Scotland (China) Co Ltd (The)
Shaanxi Fuping BEA Rural Bank Corporation.
Shanghai Pudong Development Bank
Shanghai Rural Commercial Bank
Shanxi Yaodu Rural Commercial Bank Co Ltd
Shengjing Bank

Table A-3 *(Continued)*

Shinhan Bank (China) Limited
Societe Generale (China) Limited
SPD Silicon Valley Bank
Standard Chartered Bank (China) Ltd
Sumitomo Mitsui Banking Corporation (China) Limited
Tianjin Binhai Rural Commercial Bank Corporation
United Overseas Bank (China) Limited
Weihai City Commercial Bank Co Ltd
Wing Hang Bank (China) Ltd
Woori Bank (China) Ltd
Xiamen Bank
Xiamen International Bank
Xiamen Rural Commercial Bank Co Ltd
Yantai Bank Co Ltd
Zhaoqing Duanzhou Rural Commercial Bank
Zhejiang Chouzhou Commercial Bank
Zhejiang Mintai Commercial Bank
Zhejiang Tailong Commercial Bank Co Ltd
Zhongshan Rural Commercial Bank Company Limited
Zhuhai Rural Commercial Bank Limited

Table A-4: Banks in Hong Kong

Name of bank
Allied Banking Corporation (Hong Kong) Limited
Bank of China (Hong Kong) Limited
Bank of East Asia Ltd
China CITIC Bank International Limited
China Construction Bank (Asia) Corporation Limited
Chiyu Banking Corporation Ltd.
Chong Hing Bank Limited
Chong Hing Finance Limited
Citibank (Hong Kong) Limited
Citicorp International Ltd.
Dah Sing Bank, Ltd
DBS Bank (Hong Kong) Limited
Delta Asia Credit Limited
Fubon Bank (Hong Kong) Limited
GCB Finance (HK) Ltd
Hang Seng Bank Ltd.
Hongkong and Shanghai Banking Corporation Limited (The)
ICBC International Holdings Limited
Industrial and Commercial Bank of China (Asia) Limited - ICBC (Asia)
JP Morgan Securities (Asia Pacific) Limited
Kookmin Bank Hong Kong Limited
MEVAS (1931) Limited
Nanyang Commercial Bank Ltd
OCBC Wing Hang Bank Limited
Public Bank (Hong Kong) Limited
Scotiabank (Hong Kong) Limited
Shanghai Commercial Bank Ltd
Shinhan Asia Limited
Standard Chartered Bank (Hong Kong) Limited
Tai Sang Bank Limited
Tai Yau Bank Limited
Wing Lung Bank Ltd

Table A-5: Banks in India

Name of bank
Allahabad Bank
Andhra Bank
AXIS Bank Limited
Bank of America N.A. - India Branch
Bank of Baroda
Bank of India
Bank of Maharashtra
Bank of Tokyo-Mitsubishi UFJ Ltd (The)
Bank Pembangunan Daerah Kalimantan Selatan Pagatan
Barclays Bank Plc
Canara Bank
Catholic Syrian Bank Ltd (The)
Central Bank of India
Citibank NA
City Union Bank Ltd.
Corporation Bank Ltd.
DCB Bank Limited
Dena Bank
Dhanlaxmi Bank Ltd
Dombivli Nagari Sahakari Bank Ltd
Federal Bank Ltd. (The)
HDFC Bank Ltd
HSBC India
ICICI Bank Limited
Ind Bank Housing Ltd
Indian Bank
Indian Overseas Bank
Indusind Bank Limited
Jammu and Kashmir Bank Ltd
Kalupur Commercial Co-op Bank Ltd
Karnataka Bank Limited (The)
Karur Vysya Bank Limited (The)
Kotak Mahindra Bank Limited
Lakshmi Vilas Bank Ltd
Oriental Bank of Commerce Ltd.
Parsik Janata Sahakari Bank Limited
Prathama Bank
Punjab & Sind Bank
Punjab National Bank
Rajkot Nagarik Sahakari Bank Ltd.
RBL Bank Ltd
South Indian Bank Limited
SREI Infrastructure Finance Limited
Standard Chartered Bank - Indian Branches incorporated in the UK
State Bank of Bikaner and Jaipur

Table A-5 *(Continued)*

State Bank of Hyderabad
State Bank of India
State Bank of Mysore
State Bank of Patiala
State Bank of Travancore
Syndicate Bank
Tamilnad Mercantile Bank Ltd
Thane Janata Sahakari Bank Ltd
UCO Bank
Union Bank of India
United Bank of India
Vijaya Bank
YES BANK Limited

Table A-6: Banks in Indonesia

Name of bank
Bank Antardaerah
Bank Artha Graha Internasional Tbk
Bank BNP Paribas Indonesia PT
Bank BPD Jateng-Bank Pembangunan Daerah Jawa Tengah
Bank Bumi Arta
Bank Central Asia
Bank Commonwealth
Bank Danamon Indonesia Tbk
Bank DBS Indonesia
Bank Ekonomi Rahardja
Bank Mandiri (Persero) Tbk
Bank Maspion Indonesia
Bank Mega TBK
Bank Mestika Dharma
Bank Mitraniaga Tbk PT
Bank MNC Internasional Tbk., PT
Bank Negara Indonesia (Persero) - Bank BNI
Bank Nusantara Parahyangan
Bank OCBC NISP Tbk
Bank Of Tokyo-Mitsubishi Ufj, Ltd., The
Bank Pan Indonesia Tbk PT-Panin Bank
Bank Pembangunan Daerah Kalimantan Timur
Bank Permata Tbk
Bank QNB Indonesia Tbk., PT
Bank Rabobank International Indonesia
Bank Rakyat Indonesia (Persero) Tbk
Bank Royal Indonesia
Bank SBI Indonesia PT
Bank Sinarmas TBK., PT
Bank Sumsel Babel
Bank Syariah Mandiri
Bank Tabungan Negara (Persero)
Bank Tabungan Pensiunan Nasional PT
Bank Victoria International TBK (PT)
Bank Windu Kentjana International Tbk
Hongkong and Shanghai Banking Corporation Limited (The) - Indonesian branches
PT Bank Agris
PT Bank Andara
PT Bank ANZ Indonesia
PT Bank BCA Syariah
PT Bank BNI Syariah
PT Bank BRI Syariah
PT Bank Bukopin
PT Bank Capital Indonesia
PT Bank CIMB Niaga Tbk

Table A-6 *(Continued)*
PT Bank CTBC Indonesia
PT Bank Dinar Indonesia Tbk
PT Bank DKI
PT Bank ICBC Indonesia
PT Bank Ina Perdana Tbk
PT Bank Index Selindo
PT Bank Jawa Barat Banten Syariah
PT Bank JTrust Indonesia Tbk
PT Bank KEB Hana
PT Bank Mayapada Internasional TBK
PT Bank Maybank Indonesia Tbk
PT Bank Maybank Syariah Indonesia
PT Bank Mega Syariah
PT Bank Mizuho Indonesia
PT Bank Muamalat Indonesia Tbk
PT Bank Nationalnobu Tbk
PT Bank Of India Indonesia Tbk
PT Bank Panin Syariah
Pt Bank Pembangunan Daerah Papua
PT Bank Pembangunan Daerah Riau
PT Bank Pembangunan Daerah Sulawesi Utara-Pt Bank Sulut
PT Bank Pundi Indonesia
PT Bank Rakyat Indonesia Agroniaga Tbk
PT Bank Resona Perdania
PT Bank Sahabat Sampoerna
PT Bank Sumitomo Mitsui Indonesia
PT Bank Syariah Bukopin
PT Bank UOB Indonesia
PT Bank Victoria Syariah
PT Bank Woori Indonesia
PT Bank Woori Saudara Indonesia 1906 Tbk
PT Bank Yudha Bhakti
PT BPD Jawa Barat dan Banten Tbk
PT. BPD Jawa Timur
The Royal Bank of Scotland N.V., Indonesia Branch

Table A-7: Banks in Japan

Name of bank
Aichi Bank
Akita Bank Ltd
Ashikaga Bank Ltd.
Bank of Fukuoka Ltd.
Bank of Iwate, Ltd
Bank of Kochi, Ltd
Bank of Kyoto
Bank of Nagasaki Ltd
Bank of Nagoya
Bank of Okinawa
Bank of the Ryukyus Ltd.
Chiba Bank Ltd.
Chiba Kogyo Bank
Chikuho Bank
Chukyo Bank Ltd
Citibank Japan Ltd
Daisan Bank, Ltd.
Daito Bank
First Bank of Toyama, Ltd.
Fukuoka Chuo Bank, Ltd.
Fukushima Bank
Hachijuni Bank
Higashi-Nippon Bank
Hiroshima Bank Ltd
Hokkaido Bank
Hokuriku Bank Ltd.
Hokuto Bank
Howa Bank, Ltd
Hyakugo Bank Ltd.
Hyakujushi Bank Ltd.
Iyo Bank Ltd
Japan Post Bank Co Ltd
Joyo Bank Ltd.
Kagawa Bank, Ltd.
Kanagawa Bank, Ltd.
Kansai Urban Banking Corporation
Kirayaka Bank Ltd.
Kita-Nippon Bank
Kiyo Bank
Minami-Nippon Bank, Ltd.
Minato Bank Ltd
Mitsubishi UFJ Trust and Banking Corporation-Mitsubishi UFJ Shintaku Ginko Kabushiki Kaisha
Miyazaki Bank
Mizuho Bank Ltd
Mizuho Trust & Banking Co., Ltd

Table A-7 *(Continued)*

Momiji Bank Ltd
Musashino Bank
Nagano Bank Ltd.
Nagano Kenshinren
Nomura Trust and Banking Co Ltd
North Pacific Bank
Ogaki Kyoritsu Bank
Rakuten Bank Ltd
Resona Bank Ltd
Saga Kyoei Bank, Ltd.
Saikyo Bank
Saitama Resona Bank Limited
San-In Godo Bank, Ltd
SBI Sumishin Net Bank Ltd
Sendai Bank, Ltd.
Senshu Ikeda Bank Ltd
Seven Bank Ltd
Shimane Bank Ltd
ShinGinko Tokyo
Shinsei Bank Limited
Shizuoka Bank
Shizuoka Chuo Bank, Ltd
Shonai Bank
Sony Bank
Sumitomo Mitsui Banking Corporation
Sumitomo Mitsui Trust Bank Limited
Taiko Bank Ltd
Taisho Bank Limited
The 77 Bank
The Aomori Bank Ltd
The Awa Bank
The Bank of Saga, Ltd
The Bank of Tokyo - Mitsubishi UFJ Ltd-Kabushiki Kaisha Mitsubishi Tokyo UFJ Ginko
The Bank of Toyama, Ltd
The Bank of Yokohama, Ltd
The Chugoku Bank, Ltd
The Daishi Bank Ltd
The Ehime Bank, Ltd
The Eighteenth Bank
The Fukuho Bank, Ltd
The Fukui Bank Ltd
The Gunma Bank Ltd
The Higo Bank
The Hokkoku Bank Ltd
The Hokuetsu Bank Ltd
The Juroku Bank Ltd
The Kagoshima Bank Ltd

Table A-7 *(Continued)*

The Keiyo Bank, Ltd
The Kinki Osaka Bank Ltd
The Kumamoto Bank Ltd
The Michinoku Bank, Ltd
The MIE Bank Ltd
The Miyazaki Taiyo Bank, Ltd
The Nanto Bank Ltd
The Nishi-Nippon City Bank Ltd
The Oita Bank Ltd
The Okinawa Kaiho Bank Ltd
The Shiga Bank, Ltd
The Shikoku Bank Ltd
The Shimizu Bank Ltd
The Shinwa Bank Ltd
The Suruga Bank, Ltd
The Tajima Bank Ltd
The Toho Bank Ltd
The Tokyo Tomin Bank, Ltd
The Yamanashi Chuo Bank Ltd
Tochigi Bank, Ltd.
Tohoku Bank
Tokushima Bank
Tokyo Star Bank Ltd.
Tomato Bank, Ltd
Tottori Bank
Towa Bank
Tsukuba Bank Ltd
Yachiyo Bank
Yamagata Bank Ltd.
Yamaguchi Bank

Table A-8: Banks in Malaysia

Name of bank
Affin Bank
Affin Islamic Bank Berhad
Al Rajhi Banking & Investment Corporation (Malaysia) Berhad
Alkhair International Islamic Bank Berhad
Alliance Bank Malaysia Berhad
Alliance Islamic Bank Berhad
AmBank (M) Berhad
AmINTERNATIONAL (L) Ltd
AmIslamic Bank Berhad
Asian Finance Bank Berhad
Bangkok Bank Berhad
Bank Islam Malaysia Berhad
Bank Kerjasama Rakyat Malaysia Berhad
Bank Muamalat Malaysia Berhad
Bank of America Malaysia Berhad
Bank of China (Malaysia) Berhad
Bank of Nova Scotia Berhad
Bank of Tokyo-Mitsubishi UFJ (Malaysia) Berhad
Bank Persatuan Malaysia Berhad
BNP Paribas Malaysia Berhad
Cagamas Berhad
CIMB Bank (L) Limited
CIMB Bank Berhad
CIMB Islamic Bank Berhad
Citibank Berhad
Deutsche Bank (Malaysia) Bhd.
Hong Leong Bank Berhad
Hong Leong Islamic Bank Berhad
HSBC Amanah Malaysia Berhad
HSBC Bank Malaysia Berhad
India International Bank (Malaysia) Bhd
Industrial and Commercial Bank of China (Malaysia) Berhad
JP Morgan Chase Bank Berhad
Kuwait Finance House (Malaysia) Berhad
Malayan Banking Berhad - Maybank
Maybank International (L) Ltd
Maybank Islamic Berhad
Mizuho Bank (Malaysia) Berhad
National Bank of Abu Dhabi Malaysia Berhad
OCBC Al-Amin Bank Berhad
OCBC Bank (Malaysia) Berhad
Public Bank (L) Ltd
Public Bank Berhad
Public Islamic Bank Berhad
RHB Bank Berhad

Table A-8 *(Continued)*
RHB Islamic Bank Berhad
Royal Bank of Scotland Berhad (The)
Standard Chartered Bank Malaysia Berhad
Standard Chartered Saadiq Berhad
United Overseas Bank (Malaysia) Bhd.

Table A-9: Banks in Pakistan

Name of bank
Albaraka Bank (Pakistan) Limited
Allied Bank Limited
Askari Bank Limited
Bank Al Habib
Bank Alfalah Limited
Bank of Khyber
Bank of Punjab
BankIslami Pakistan Limited
Burj Bank Limited
Dubai Islamic Bank Pakistan Limited
Faysal Bank Ltd
First Women Bank Limited
Habib Bank Limited
Habib Metropolitan Bank Limited
JS Bank Limited
KASB Bank Limited
MCB Bank Limited
Meezan Bank Limited
National Bank of Pakistan
NIB Bank Ltd
Royal Bank of Scotland Ltd (The)
Samba Bank Limited
Silkbank Limited
Sindh Bank Limited
Soneri Bank Limited
Standard Chartered Bank (Pakistan)
Summit Bank Limited
United Bank Limited

Table A-10: Singapore

Name of bank
ANZ Singapore Limited
Bank of Singapore Limited
Citibank Singapore Limited
DBS Bank Ltd
Far Eastern Bank Limited
Hong Leong Finance Limited
LGT Bank (Singapore) Ltd
Morgan Stanley Asia (Singapore)
Oversea-Chinese Banking Corporation Limited OCBC
Royal Bank of Canada (ASIA) Ltd RBC
Sarasin (Asia) Limited
Singapore Island Bank Ltd
Standard Chartered Bank (Singapore) Limited
Toronto Dominion (South East Asia) Limited
United Overseas Bank Limited UOB
Westpac Singapore Limited

Appendix 2: Correlation Matrices

Table A-11: Correlation matrix for ten countries (Chapter 5)

Variables	Lag GDP	(1 + ROA)	Lag (1 + ROA)	SIZE	INF	EXP	TRADE	MKTCAP
Lag GDP	1							
(1 + ROA)	0.45	1						
Lag (1 + ROA)	0.45	0.87	1					
SIZE	-0.01	-0.04	-0.04	1				
INF	0.19	0.33	0.36	-0.23	1			
EXP	0.31	0.35	0.32	-0.33	0.21	1		
TRADE	-0.11	-0.02	-0.04	-0.13	-0.03	-0.07	1	
MKTCAP	-0.01	0.03	0.00	0.17	-0.09	-0.08	-0.09	1

Table A-12: Correlation matrix of explanatory variables for ten countries (Chapter 6)

Variables	NPLR	CAR	SIZE	LDR	OFFBS	COST	GOWN	CRR	FININC	INF	INT	GDP
NPLR	1											
CAR	-0.07	1										
SIZE	0.21	-0.047	1									
LDR	0.01	-0.15	0.16	1								
OFFBS	-0.04	0.09	0.16	-0.062	1							
COST	0.29	0.050	-0.08	0.01	-0.35	1						
GOWN	0.14	-0.08	0.16	-0.01	0.13	-0.09	1					
CRR	-0.21	-0.01	-0.148	-0.25	0.24	-0.38	0.03	1				
FININC	-0.024	-0.177	-0.26	0.13	-0.54	0.37	-0.20	-0.61	1			
INF	0.20	0.11	0.27	0.09	0.32	-0.10	0.26	0.14	-0.61	1		
INT	0.31	-0.049	0.16	0.04	0.08	0.02	0.14	0.27	-0.42	0.63	1	
GDP	-0.137	0.061	-0.09	-0.16	0.43	-0.43	0.16	0.66	-0.74	0.29	0.21	1

Table A-13: Correlation matrix of explanatory variables four emerging markets (Chapter 7)

Variables	NPLR	CAR	SIZE	LDR	OFFBS	COST	GOVT	CRR	FININC	INF	INT	GDP
NPLR	1											
CAR	-0.08	1										
SIZE	-0.08	-0.36	1									
LDR	-0.13	-0.12	-0.04	1								
OFFBS	0.01	-0.14	0.07	0.13	1							
COST	0.37	0.14	-0.31	-0.18	-0.23	1						
GOVT	0.25	-0.12	0.33	-0.06	0.00	-0.01	1					
CRR	0.15	-0.07	-0.23	0.13	-0.10	0.15	-0.03	1				
FININC	-0.10	0.08	0.35	-0.12	0.06	-0.07	0.01	-0.47	1			
INF	0.28	-0.10	-0.27	0.05	-0.05	0.19	0.01	0.49	-0.65	1		
INT	0.30	-0.06	-0.27	0.01	-0.13	0.28	0.00	0.49	-0.61	0.83	1	
GDP	-0.19	-0.01	-0.08	0.15	0.05	-0.18	-0.03	0.09	-0.15	-0.24	-0.29	1

Table A-14: Correlation matrix of explanatory variables for China (Chapter 8)

Variables	NPLR	CAR	SIZE	LDR	OFFBS	COST	GOVT	CRR	FININC	INF	INT	GDP
NPLR	1											
CAR	-0.20	1										
SIZE	-0.06	-0.30	1									
LDR	0.05	-0.02	-0.04	1								
OFFBS	0.03	-0.08	-0.10	0.15	1							
COST	0.09	0.36	-0.31	0.08	0.06	1						
GOVT	0.09	-0.09	0.45	0.15	-0.01	-0.07	1					
CRR	-0.38	0.16	0.13	-0.25	-0.14	-0.02	-0.06	1				
FININC	0.04	0.06	-0.05	-0.07	0.01	0.08	-0.07	-0.18	1			
INF	-0.05	0.06	-0.01	-0.03	-0.01	-0.07	-0.01	0.26	-0.23	1		
INT	0.02	-0.01	-0.02	-0.04	0.04	-0.07	-0.01	-0.21	-0.01	0.42	1	
GDP	0.29	-0.09	-0.17	0.29	0.11	0.03	0.05	-0.61	-0.31	0.23	0.47	1

Table A-15: Correlation matrix of explanatory variables for India (Chapter 8)

Variables	NPLR	CAR	SIZE	LDR	OFFBS	COST	GOVT	CRR	FININC	INF	INT	GDP
NPLR	1											
CAR	0.07	1										
SIZE	-0.29	-0.41	1									
LDR	-0.45	-0.13	0.36	1								
OFFBS	-0.14	-0.10	0.26	-0.03	1							
COST	0.13	-0.29	-0.10	0.05	-0.27	1						
GOVT	-0.05	-0.43	0.56	0.09	0.10	0.03	1					
CRR	-0.06	-0.02	-0.03	-0.06	0.15	0.04	0.01	1				
FININC	-0.21	0.00	0.20	0.37	-0.30	-0.01	-0.03	-0.42	1			
INF	-0.41	0.13	0.18	0.40	-0.08	-0.06	-0.03	-0.20	0.35	1		
INT	-0.05	0.00	0.08	0.11	-0.13	-0.02	-0.01	-0.18	0.38	-0.08	1	
GDP	0.19	-0.01	-0.11	-0.19	0.09	0.03	0.02	-0.02	-0.36	-0.14	-0.28	1

Table A-16: Correlation matrix of explanatory variables for four developed countries (Chapter 9)

Variables	NPLR	CAR	SIZE	LDR	OFFBS	COST	CRR	FININC	INF	INT	GDP
NPLR	1.00										
CAR	-0.37	1.00									
SIZE	0.00	-0.39	1.00								
LDR	-0.01	-0.37	0.08	1.00							
OFFBS	-0.32	0.44	-0.14	-0.24	1.00						
COST	0.34	-0.18	-0.18	-0.10	-0.31	1.00					
CRR	-0.29	0.01	-0.08	0.43	-0.10	-0.09	1.00				
FININC	0.47	-0.45	0.28	0.12	-0.52	0.39	-0.21	1.00			
INF	-0.48	0.30	-0.24	0.04	0.35	-0.32	0.32	-0.51	1.00		
INT	0.38	-0.38	0.12	0.15	-0.36	0.15	0.02	0.60	-0.21	1.00	
GDP	-0.28	0.27	-0.19	0.00	0.31	-0.32	0.17	-0.52	0.29	-0.27	1.00

Appendix 3: Bank Assets to Population Ratio

Table A-17: Bank Assets to Population Ratio

Country Name		2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Median
Australia	Bank Assets (US$ m)	924,070.90	1,099,766.75	1,266,943.49	1,787,311.16	1,975,765.81	2,262,146.17	2,594,494.92	2,975,205.32	3,174,274.54	3,022,776.66	3,142,543.90	2,262,146.17
	Population	20,127,400	20,394,800	20,697,900	20,827,600	21,249,200	21,691,700	22,031,750	22,340,024	22,728,254	23,117,353	23,464,086	21,691,700.00
	Assets/Population	**0.04591**	**0.05392**	**0.06121**	**0.08581**	**0.09298**	**0.10429**	**0.11776**	**0.13318**	**0.13966**	**0.13076**	**0.13393**	**10%**
Bangladesh	Bank Assets (US$ m)	22,654.6	23,938.2	26,921.6	33,490.2	38,152.0	45,439.5	59,168.8	64,035.2	78,165.8	203,720.1	106,059.3	45,439.52
	Population	140,843,786	142,929,979	144,839,238	146,592,687	148,252,473	149,905,836	151,616,777	153,405,612	155,257,387	157,157,394	159,077,513	149,905,836.00
	Assets/Population	**0.00016**	**0.00017**	**0.00019**	**0.00023**	**0.00026**	**0.00030**	**0.00039**	**0.00042**	**0.00050**	**0.00130**	**0.00067**	**0%**
China	Bank Assets (US$ m)	2,967,389.61	3,684,717.42	4,490,615.16	5,815,595.45	7,445,262.33	9,431,119.13	11,699,427.73	14,600,644.95	17,754,276.79	20,487,290.99	22,695,888.32	9,431,119.13
	Population	1,296,075,000	1,303,720,000	1,311,020,000	1,317,885,000	1,324,655,000	1,331,260,000	1,337,705,000	1,344,130,000	1,350,695,000	1,357,380,000	1,364,270,000	1,331,260,000.00
	Assets/Population	**0.00229**	**0.00283**	**0.00343**	**0.00441**	**0.00562**	**0.00708**	**0.00875**	**0.01086**	**0.01314**	**0.01509**	**0.01664**	**1%**
Hong Kong	Bank Assets (US$ m)	684,260.63	744,756.32	858,961.07	1,040,290.49	1,126,424.27	1,184,135.65	1,391,173.49	1,549,858.17	1,710,573.83	1,848,408.47	1,992,422.01	1,184,135.65
	Population	6,783,500	6,813,200	6,857,100	6,916,300	6,957,800	6,972,800	7,024,200	7,071,600	7,154,600	7,187,500	7,241,700	6,972,800.00
	Assets/Population	**0.10087**	**0.10931**	**0.12527**	**0.15041**	**0.16189**	**0.16982**	**0.19805**	**0.21917**	**0.23909**	**0.25717**	**0.27513**	**17%**
India	Bank Assets (US$ m)	422,577.53	488,511.78	570,056.32	728,357.89	992,594.44	957,591.68	1,239,816.89	1,515,309.50	1,527,753.69	1,656,540.59	1,714,964.83	992,594.44
	Population	1,126,419,321	1,144,326,293	1,162,088,305	1,179,685,631	1,197,070,109	1,214,182,182	1,230,984,504	1,247,446,011	1,263,589,639	1,279,498,874	1,295,291,543	1,214,182,182.00
	Assets/Population	0.00038	0.00043	0.00049	0.00062	0.00083	0.00079	0.00101	0.00121	0.00121	0.00129	0.00132	0%
Indonesia	Bank Assets (US$ m)	111,551.24	123,051.01	156,324.77	181,053.42	179,909.15	240,342.49	305,412.71	372,154.99	411,900.99	389,838.79	433,569	240,342.49
	Population	223,268,606	226,254,703	229,263,980	232,296,830	235,360,765	238,465,165	241,613,126	244,808,254	248,037,853	251,268,276	254,454,778	238,465,165.00
	Assets/Population	**0.00050**	**0.00054**	**0.00068**	**0.00078**	**0.00076**	**0.00101**	**0.00126**	**0.00152**	**0.00166**	**0.00155**	**0.00170**	**0%**
Japan	Bank Assets (US$ m)	6,329,094.85	6,173,424.18	5,769,858.57	5,709,404.84	9,089,028.46	8,745,741.73	9,259,891.26	10,695,866.75	11,901,939.79	10,982,287.26	11,143,120.61	9,089,028.46
	Population	127,761,000	127,773,000	127,854,000	128,001,000	128,063,000	128,047,000	128,070,000	127,817,277	127,561,489	127,338,621	127,131,800	127,817,277.00
	Assets/Population	**0.04954**	**0.04832**	**0.04513**	**0.04460**	**0.07097**	**0.06830**	**0.07230**	**0.08368**	**0.09330**	**0.08624**	**0.08765**	**7%**
Malaysia	Bank Assets (US$ m)	213,370.32	244,326.43	308,946.90	370,125.80	424,930.47	460,956.76	563,091.92	712,061.20	906,718.41	952,114.38	976,032.25	460,956.76
	Population	25,332,026	25,796,124	26,263,048	26,730,607	27,197,419	27,661,017	28,119,500	28,572,970	29,021,940	29,465,372	29,901,997	27,661,017.00
	Assets/Population	**0.00842**	**0.00947**	**0.01176**	**0.01385**	**0.01562**	**0.01666**	**0.02002**	**0.02492**	**0.03124**	**0.03231**	**0.03264**	**2%**
Pakistan	Bank Assets (US$ m)	42,281.80	50,435.75	64,520.87	79,089.09	66,172.16	72,393.41	78,044.09	87,317.63	115,098.50	96,998.94	116,546.94	78,044.09
	Population	150,267,989	153,356,383	156,524,189	159,767,672	163,096,985	166,520,983	170,043,918	173,669,648	177,392,252	181,192,646	185,044,286	166,520,983.00
	Assets/Population	**0.00028**	**0.00033**	**0.00041**	**0.00050**	**0.00041**	**0.00043**	**0.00046**	**0.00050**	**0.00065**	**0.00054**	**0.00063**	**0%**
Singapore	Bank Assets (US$ m)	248,785.03	265,351.06	349,730.16	428,659.36	425,361.19	468,733.88	579,114.59	668,375.33	745,705.58	848,459.08	905,932.48	468,733.88
	Population	4,166,664	4,265,762	4,401,365	4,588,599	4,839,396	4,987,573	5,076,732	5,183,688	5,312,437	5,399,162	5,469,724	4,987,573.00
	Assets/Population	**0.05971**	**0.06220**	**0.07946**	**0.09342**	**0.08790**	**0.09398**	**0.11407**	**0.12894**	**0.14037**	**0.15715**	**0.16563**	**9%**